

COMPUTERWORLD

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Hidden costs mine OS/2 field

Pricey surprise may await users planning upgrade — even on PS/2s

BY STEPHEN JONES
and ALAN J. RYAN
CW STAFF

If you are expecting to run fancy
next-generation applications under
OS/2 on that PC AT you
bought two years ago, get ready
for a surprise: You may face

nearly \$5,000 in additional ex-
penses to do so.

Even if you just bought an
IBM Personal System/2 Model
50 last week, you are probably
looking at extensive upgrade
costs, not to mention what users
say will be substantially higher
long-term expenses for support

and software.

IBM and Microsoft Corp.'s
OS/2 is emerging as an expen-
sive proposition for large corpo-
rations, some of which may find
themselves saddled with millions
of dollars in additional costs if
they want to provide their base
of IBM Personal Computer AT
users with the latest and great-
est operating system.

ers familiar with OS/2 said last
week that a basic 80286-based
micro can run one OS/2 applica-
tion, but at least 3M bytes of
memory are recommended if a
user wants to run two or more
applications at once.

"You can run OS/2 on a [stan-
dard] AT if you want to, but you
probably won't be able to run
anything else," said Bill Higgs,
director of software research at
Infocorp in Cupertino, Calif.

High price to pay

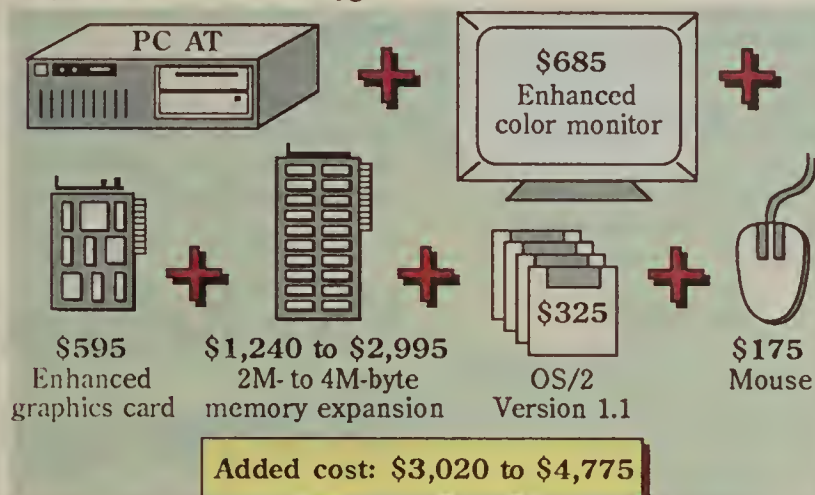
Infocorp has estimated that the
cost of implementing OS/2 on a
basic AT — including memory
add-ins, operating system, appli-
cations software and user train-
ing — could range from \$2,000
to \$8,000.

For example, the cost of add-
ing the 3M bytes of memory
needed to effectively run OS/2
on a PS/2 Model 50 could run as
high as \$1,750 at retail list
prices. The machine comes stan-
dard with 1M byte of memory.

Continued on page 6

It won't come easy

*Although OS/2 will run on an IBM PC AT, the future Version 1.1
may involve considerable upgrade costs*



CW CHART: AMY J. SWANSON

60 MIPS go under a desk

BY NELL MARGOLIS
CW STAFF

BOSTON — Apollo Computer,
Inc. planted the first flag — if
only by hours — in the suddenly
hot supercomputing workstation
territory last week with a 64-bit
RISC-based parallel processing
machine the firm claimed can de-
liver 60 to 100 MIPS.

With the Domain Series
10000 Personal Supercom-
puter, Apollo blasted past high-
end workstation competitors
into the realm of minisupercom-
puter manufacturers, according
to market analysts.

Considering it did not exist a
week ago, the supercomputing
workstation niche is quickly get-
ting crowded. Ardent Computer
Corp.'s Titan debuted on the
West Coast (see story page 8) as

Apollo was rising in the East —
and that was just for starters.
Within the month, Newton,
Mass.-based Stellar Computer,
Continued on page 8

NCR to show next mini line

BY JEAN S. BOZMAN
CW STAFF

NCR Corp. is poised to announce
a processor family that will allow
the firm's ITX operating system
to operate at near-mainframe
levels, according to NCR cus-
tomers and industry analysts.
The systems, reportedly named
the NCR 10000 series, are set to
be announced in New York early
next week.

Several NCR customers con-
tacted last week said NCR prod-
uct managers had told them
there will be four models, span-
ning an approximate price range
from \$50,000 to \$200,000 or
more. NCR declined comment.

Continued on page 116

HELP WANTED

MIS stares at skills crunch

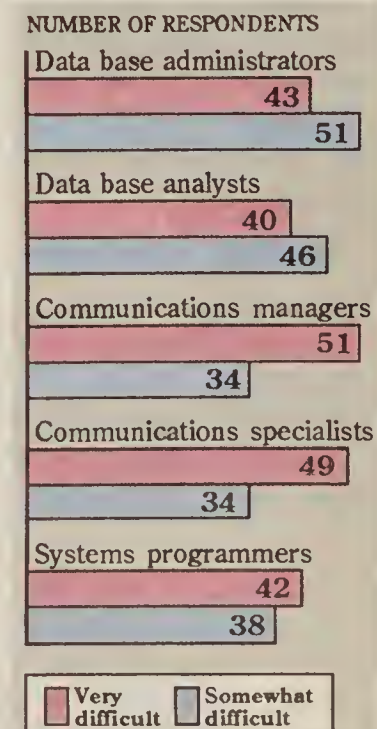
BY MICHAEL
SULLIVAN-TRAINOR
CW STAFF

A recent *Computerworld*
survey of 100 MIS managers
revealed the following:

Continued on page 117

Shortages shrink talent pool

*In a CW survey, 100 MIS
managers rate the difficulty of
filling the following positions*



CW CHART

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Beefed up. Convex unveils the C series of Unix-based single- and multiprocessing systems that appear to be pitted not against Cray but archrival Alliant. Page 4.

Scaled down. Ardent aims Titan, a "shrunk-down Cray," at bridging gap between high-end workstations and minisupers. The graphics supercomputer's debut coincides with the announcement of similar systems from Apollo and Stellar. Page 8.

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Automation comes to the rescue of MIS managers. Page 85.

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Quotable

"We are willing to pay any license fees to anyone we infringe upon. We've told IBM to just send us the bill."

RAJ JASWA
CHIPS AND
TECHNOLOGIES, INC.

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NEWS

LANs bridge to ISDN

Microcom to link local nets over long distance

BY JAMES DALY
CW STAFF

NORWOOD, Mass. — Microcom, Inc. became the first company to plug Integrated Services Digital Network (ISDN) telecommunications standards into a LAN-to-LAN connectivity product when it unveiled the MLB/1500 local-area network bridge last week.

The bridge marks an important milestone for the evolving ISDN to develop a toehold in the rapidly expanding LAN market, according to Larry DeBoever, a networking consultant in Acton, Mass.

"This is absolutely the right kind of application for ISDN. Many people use T1 bridges to connect LANs, and, basically, they're substituting ISDN for T1. In a year, everyone will be making them," DeBoever said.

Calling all LANs

The bridge supports link speeds of up to 64K bit/sec. over a dial-up long-distance connection between LANs, Microcom said. It also passes LAN packets regard-

less of what type of higher level networking protocol was used to generate them, according to the vendor.

The MLB/1500 is made up of three parts: a wide-area network module that controls the ISDN line link between the bridges; a LAN interface module that handles the packet traffic on the LAN; and a bridge management module that receives the packets from the LAN interface module, establishes communications links, keeps track of LAN and wide-area networking statistics and controls the general operation of the system.

The bridge also employs learning and filtering algorithms to increase network efficiency and ensure that only data packets used for remote LANs are passed over the bridge.

Microcom said networks that use Novell, Inc.'s Netware, 3Com Corp.'s 3+, Digital Equipment Corp.'s Decnet or Transmission Control Protocol/Internet Protocol can take advantage of the bridge, which is priced at \$12,500 and available 90 days after receipt of order.

Five Bells peal together as Ameritech unites MIS

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Ameritech recently said it is consolidating the MIS staffs of its five Midwestern telephone companies into a single organization called Ameritech Applied Technologies, Inc.

Glen Arnold, president of Ameritech Applied Technologies, said Ameritech created the subsidiary to help standardize a variety of internal computer systems it inherited from Illinois Bell, Wisconsin Bell, Michigan Bell, Indiana Bell and Ohio Bell.

"Some of our software systems are getting rather old," Arnold said last week. "We feel that if you're going to update these systems, it would be more efficient to update them once than to do it five times in five states."

Now, the development of common systems will be stressed — each software system and data base will be designed for use throughout Ameritech.

The new company, now being incorporated, is a wholly owned subsidiary of Ameritech with a total staff of 3,000 and a headquarters staff of 100 in Chicago. The realignment process began last week, as some managers in Ameritech Services and the Ameritech Bell companies were

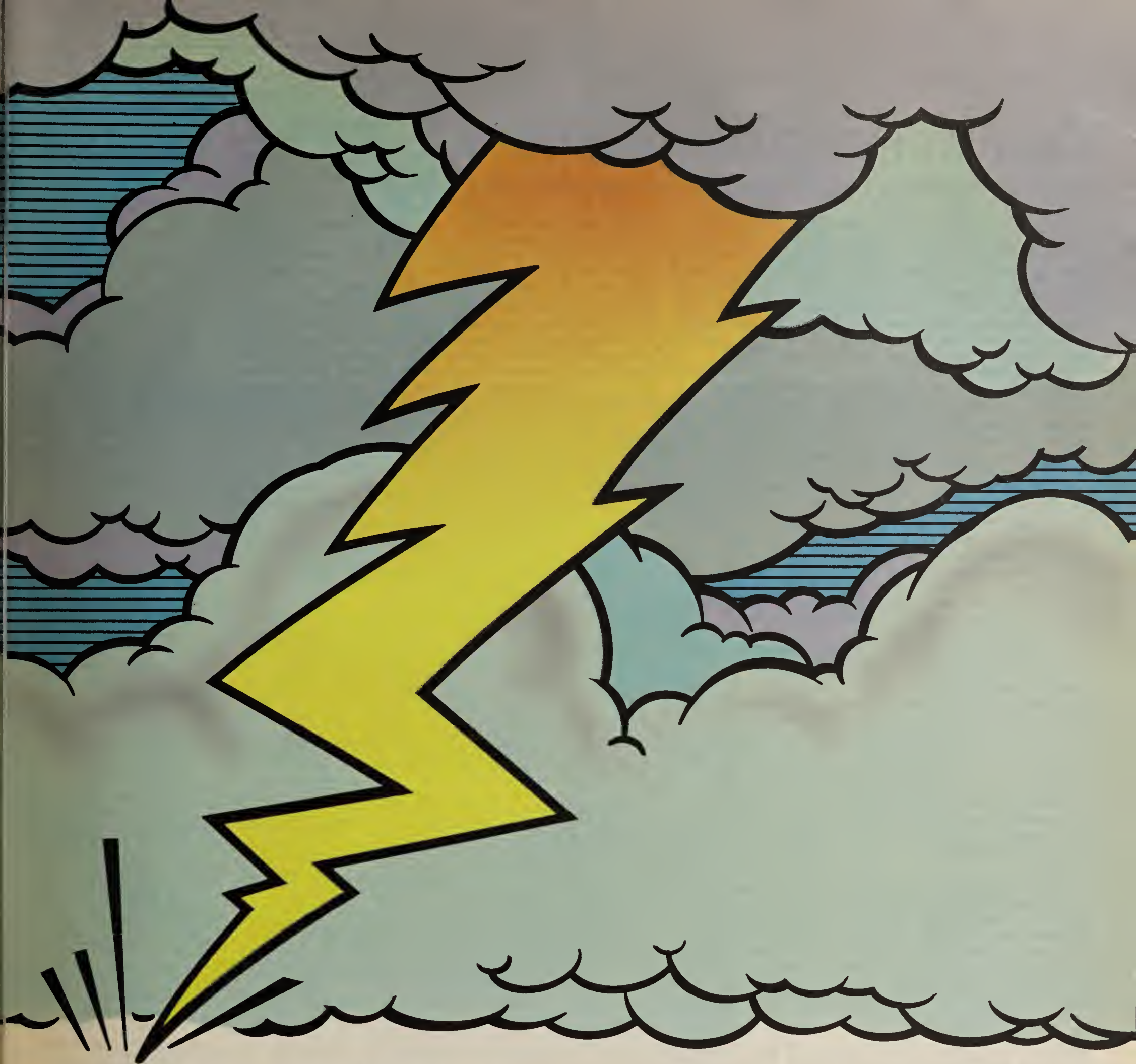
assigned new positions. Despite the changes, more Ameritech employees have moved to new jobs on paper than in moving vans.

No major moves

"We're going to have a small headquarters staff that will focus on strategic architectures," Arnold said. "But the software development people will stay close to our end users. Most of them are not going to have to move at all." No layoffs are expected, Arnold said, adding that there will be new hires at the firm's headquarters.

Until now, each MIS shop within Ameritech had its own set of hardware and software. Wisconsin Bell and Indiana Bell were largely IBM shops, while Illinois Bell had former Sperry Corp. computers and Michigan Bell had a combination of IBM, Sperry and former Burroughs Corp. equipment. For this reason, the strategic software systems for billing, administration and services also varied throughout the company.

The subsidiary's incorporation is expected to become final sometime next month, when regulatory agencies in the five Midwestern states give their official approval.



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Convex raises minisuper stakes

High end of series claims to rival Cray performance for fraction of cost

BY ALAN ALPER
CW STAFF

NEW YORK — Convex Computer Corp. last week unveiled a long-anticipated family of single- and multiprocessing systems, the high end of which is said to slightly exceed the performance of a Cray Research, Inc. X-MP/14 at one-quarter the price.

The C series includes two re-packaged versions of Convex's existing C1 uniprocessor — both with reduced prices — and a processor that forms the basis of a multiprocessing architecture. The new architecture supports multiprocessing configurations of up to four tightly coupled 64-bit processors and can perform parallel operations, the company said.

All of the C series systems are Unix-based and feature integrated scalar/vector processors. The C1s — renamed C120 and C130 — and the C210, the base processor for multiprocessing configurations, are currently available. The C220, a two-processor version, is set to ship next quarter, while tri- and quad-processor configurations — known as the C230 and C240 — will be available in the fourth quarter, the firm said. Prices of the C series machines range from \$275,000 to \$1.4 million, Convex said.

The C series offers vector performance of between 20 and 200 64-bit million floating-point operations per second and scalar performance of between 11 and 124 Whetstone millions of instructions per second, Convex said.

A computational chemistry application called Amber is said to run 2.5 times faster on a C120 than on a Digital Equipment Corp. VAX 8800 that is 66% more expensive. The same application ran at the same speed on the C240 as on the Cray X-MP/14, Convex claimed.

Trying to break mold

Industry analysts and observers said the new product family represents an attempt by the Dallas firm to distinguish itself from a growing number of competitors at a time when growth has slowed in the so-called minisupercomputer arena and aggressive pricing has become the name of the game.

"This family is important to Convex because they need to have a faster follow-on system with more features to stay in the game," noted Gary Smaby, an analyst at Piper, Jaffrey & Hopwood in Minneapolis.

International Data Corp. (IDC), a Framingham, Mass.-based research firm, is revising downward its earlier estimate that the minisupercomputer market would reach \$250 million last year. "We initially expected the compound annual growth rate for 1986 through 1991 to reach almost 40%, but that will come down," IDC analyst Marcia Brooks noted. Growth in the minisuper market will probably still exceed the 30.4% growth rate IDC projected for the high-performance system market overall, she said.

While Convex has continually compared the products with supercomputer leader Cray's, the

C series seems directly aimed at archival Alliant Computer Systems Corp. Alliant recently unveiled a processor family and has touted the alleged advantages of parallel processing since its formation. Alliant has also staked out the lower end of the market with systems priced lower than \$100,000, in contrast to Convex's performance-oriented strategy, analysts noted.

Leader of the pack

First out of the gate five years ago, Convex is the acknowledged leader in the minisuper class, having shipped approximately 260 systems to some 150

international customers.

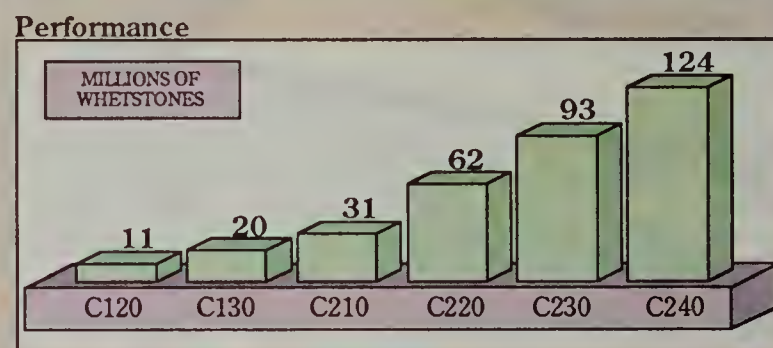
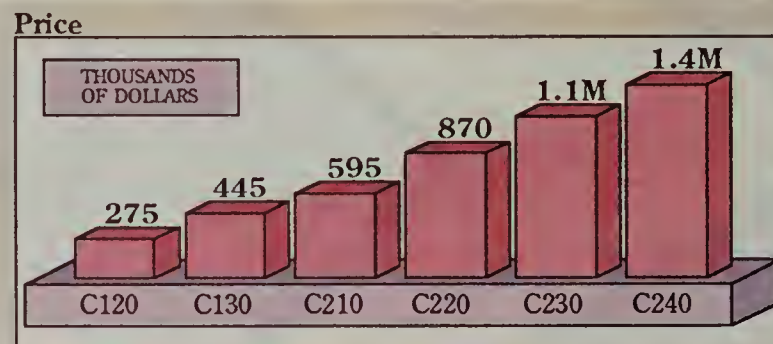
The entry-level C120 continues to use the TTY logic chips of the earlier C1 series, but Convex increased by up to one gigabyte the amount of physical memory the machine can support and reduced its price by roughly 20%; the C130 and more powerful systems use gate emitter-coupled logic chips.

The C200 processors can support up to 2G bytes of memory and share an intelligent I/O subsystem said to move data at 200M byte/sec. Both Multibus and VMEbus interfaces are standard with the systems.

Because the machines are air-cooled, they require less floor space and are less expensive to operate than large-scale IBM or Cray systems, claimed Steven Wallach, Convex vice-president of technology.

Second series

Convex expands power range by replacing its existing C1 processor with six configurations in a new series



INFORMATION PROVIDED BY CONVEX COMPUTER CORP.
CW CHART

MIS gets share of Fidelity layoffs

BY DAVID A. LUDLUM
CW STAFF

The layoffs of information systems professionals prompted by last October's stock market crash spread to Boston's sizable money management community last week as Fidelity Investments dismissed about 10% of its systems work force.

The dismissal of about 100 systems workers was in line with layoffs among most of the support and customer service departments at Fidelity, which let go approximately 800 employees, or about 10% of its work force.

The move came as Fidelity reorganizes its systems workers, moving the roughly two-thirds who develop applications from the central data processing organization, Fidelity Information Services Co. It is assigning about half those workers to indi-

vidual business units and the other half to a new central organization, Fidelity Systems Development Co. [CW, Feb. 8]

Across the board

Michael Simmons, president of Fidelity Information Services, said he thinks systems layoffs are spread evenly among the two central groups and the business unit application developers.

"The idea is to try and become more productive. We didn't suspend anything. We didn't stop anything. We've reduced the number of people, and now we'll see how we can do the work," Simmons said. Across-the-board systems layoffs would hit about 70% in Boston and the rest in Dallas, he said.

Fidelity, the nation's biggest independent mutual fund firm, has expanded much more aggressively than its rivals, in part through encouraging frequent

buying and selling of funds and touting both automated and personal customer service via 24-hour-a-day telephone lines.

Both moves led to rapid expansion of the systems work force. Last year, there were about 300 hires, and as in past years, systems workers who recruited new employees stood to win a Mercedes.

Fidelity, the first mutual fund company to retrench so sharply, has thus cut its systems work force only to the level of mid-1987, Simmons said.

He declined to describe how layoffs were targeted, but a spokesman said those whose jobs were considered expendable were let go. "I would not say it was a performance-based thing at all. It was based on position," the spokesman said.

The reorganization — launched informally prior to the stock market crash at the behest

of Fidelity Chairman Edward C. Johnson III — is also aimed in part at controlling costs, said Richard Johnson, a Fidelity Information Services executive vice-president.

Time-out to regroup

"It will allow us to back up and put some necessary controls in place and assign specific accountabilities for each group to get things done in the time we want to get them done. It's an opportunity to regroup and get some controls in place," Johnson said.

The spokesman said affected employees will be eligible for severance pay ranging from six weeks' pay to "substantially more," depending on length of service, as well as help in job hunting.

Since the beginning of the year, Fidelity has laid off about 100 contract systems workers and about 300 other employees, most of them temporary customer service workers.

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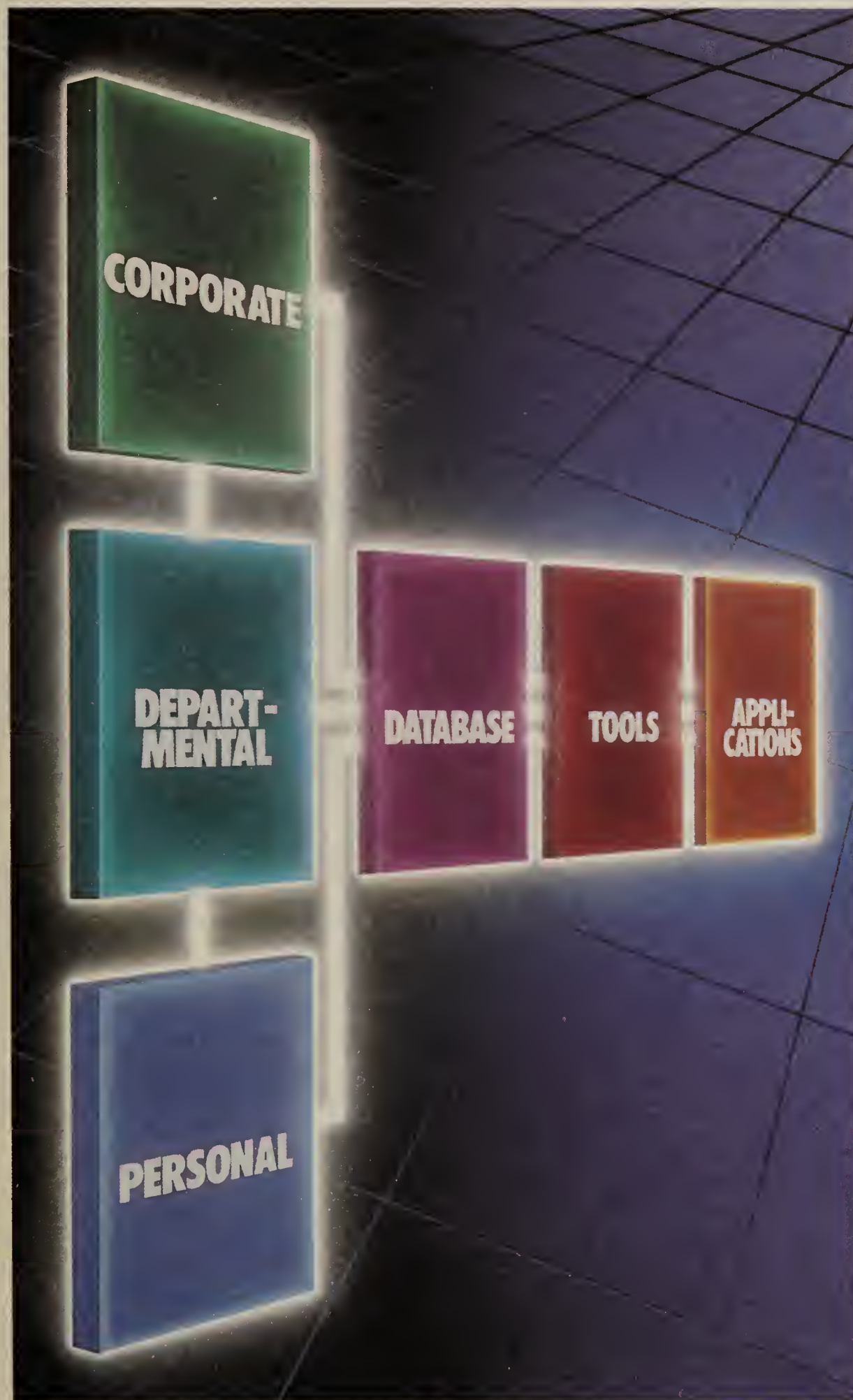
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HP, AST tout customized OS/2 versions

BY JAMES A. MARTIN
CW STAFF

Two more microcomputer vendors, Hewlett-Packard Co. and AST Research, Inc., joined the OS/2 software bandwagon last week, announcing their own versions of the Microsoft Corp. operating system.

HP said it will offer three versions of OS/2 for its Vectra series of personal computers. The first, OS/2 1.0 Version A, will run on Intel Corp. 80286-based Vectra ES and ES/12 micros and 80386-based RS/16 and RS/20 micros. It is set to be available in April for \$325.

Version A will reportedly offer all basic OS/2 features as well as a dual-boot mode that enables users to choose between OS/2 and Microsoft's MS-DOS when booting up the system, and support for the HP proprietary mouse interface.

OS/2 1.0 Version B is said to add to those capabilities support for the original HP Vectra PC and its proprietary features, such as keyboard and disk interface cards. This version will be available during the second half of this year, at a price that has not yet been determined, according to Bill Johnson, marketing manager for the HP PC Group.

The third version, OS/2 1.1, includes the Microsoft Presentation Manager graphical interface and will be shipped in early 1989 at an as yet undetermined price, according to the company.

No rival to IBM's tool

The initial HP OS/2 release does not offer any of the capabilities that IBM is planning with its proprietary OS/2 Extended Edition, which includes enhanced micro-to-host communications, Johnson said.

"But we are very interested and involved in PC connectivity with our minicomputers, and it fits into our overall connectivity strategy," he added.

AST's OS/2 is also priced at \$325, in line with IBM and Compaq Computer Corp. versions of the operating system.

The AST OS/2 version is scheduled to ship this week, and the Presentation Manager will follow when available later this year.

AST's OS/2 includes the dual-boot option between MS-DOS and OS/2 and was designed to work with AST Premium/286, Premium/386, the Premium Workstation and the Xformer/286 motherboard.

A spokesman said the AST OS/2 version is able to run on all of the firm's CPUs.

Buyers take chip shortage in stride

BY ED SCANNELL
CW STAFF

The growing shortage of memory chips finally took its toll last week as two major suppliers of memory enhancement products were forced to raise their prices.

However, most systems manufacturers said they did not expect the increases to drive up prices on their products during the next few months.

AST Research, Inc. said shortages of both 256K-bit and 1M-bit memory chips forced it to raise prices by 10% to 15% on all desktop systems delivered after June 1, with larger increases to be applied to its memory boards. Quadram Corp. also told key accounts last week it would be raising prices on its series of memory boards, although it declined to say by how much as of press time.

Most corporate MIS managers who were contacted also said they did not expect the shortages to adversely affect system

prices and had no plans to change their purchasing decisions during the course of this year.

The chip shortage may "slow down the decline in prices" of microcomputers this year, but it will not raise prices, predicted Kavin Moody, Gillette Co.'s MIS director. Moody said he did not plan to make any major adjustments in his budget for microcomputer purchases this year.

Officials at both Quadram and AST indirectly blamed the 2-year-old U.S. trade agreement with Japan, which caused a dramatic reduction in shipments of dynamic random-access memory chips to the U.S. and prompted sharp increases in chip prices.

Japan currently makes the vast majority of memory chips for the U.S. market. Volume prices of 256K-bit dynamic RAMs have risen from \$1.70 each last summer to its current price of \$3.25, according to analysts.

"If all trade restrictions were removed by a wave of the magic

wand, the situation would improve dramatically," said Venkat Mohan, a vice-president at Quadram.

The lack of 1M-bit chips has resulted in a significant backlog of Quadram's add-in products for IBM's Personal System/2 line, Mohan said. Most board and systems vendors expect shortages to persist throughout the rest of the year.

Last week, however, the American Electronics Association and the Semiconductor Association issued a joint statement urging the U.S. government to gain access to the Japanese market for American companies and encourage U.S. semiconductor firms to re-enter the dynamic RAM market.

"I think you'll see a variety of U.S. [chip] manufacturers who previously dropped out of the dynamic RAM market bringing their lines back up," said Mike Swavelly, Compaq Computer Corp.'s vice-president of marketing. Currently, only Texas In-

struments, Inc. and Micron Technology, Inc. have any significant share of the memory chip market.

Swavelly and officials from other IBM-compatible product vendors said they do not expect to increase prices this year but admitted they probably will not be able to drop prices as sharply as expected either.

"Some people were predicting that prices would go down in the second quarter, but I don't think that is going to happen," said John Patterson, Tandy Corp.'s vice-president in charge of product development.

Zenith Data Systems does not expect any systems pricing changes over the short term because it has signed long-term agreements with chip manufacturers to meet its sizable government contracts.

Some observers said IBM will be hurt less than its competitors because it has its own chip foundry. An IBM spokesman said his company produces most of the 1M-bit chips it uses in its systems and relies to a lesser degree on second sources.

OS/2 field

FROM PAGE 1

Users who want to take advantage of all of the communications benefits of OS/2 Extended Edition 1.1 will need more than 4M bytes of memory; Extended Edition itself will sell for \$795.

Those users who consider IBM's forthcoming Presentation Manager graphical user interface the key to OS/2 should tack on \$900 for a color monitor and mouse, both of which are recommended. Older PCs that do not have an IBM Video Graphics Array card will have to add one for \$500 to \$600.

It is also expected that applications written to take advantage of the Presentation Manager will be more costly than their DOS counterparts.

Then there are the hidden expenses. One user noted that because OS/2 comes in 5¼-in. 1.2M-byte, or 3½-in. 1.44M-byte, formats, he would have to purchase a new disk drive to install the operating system on some of his older ATs.

Don't forget support

The estimated costs to get OS/2 up and running do not include the less tangible but equally costly long-term support issues, which could add thousands of dollars to the cost of upgrading each PC in an organization.

"Machine by machine, it will take at least one man-day to get information off the old machine and get the new system up and running by the time we go through all the backups and data conversion," said Jim Danielson, supervisor of information systems at Bendix Corp. in Elyria,

Ohio, which has 500 PCs running DOS.

Because MIS staffs will be supporting two or more operating systems, more resources will be required, said Michael Reilly, assistant vice-president of office systems at Metropolitan Life Insurance Co. in New York, which has 3,000 DOS users.

Bogged down

The requirements for the Presentation Manager alone could create more serious problems. Analysts and software developers said that 80286-based machines running at 10 MHz or less will plod along at prohibitively slow speeds when running the graphics-based user interface and OS/2 Extended Edition.

"In terms of performance, the 386-based machine makes all

the difference in the world; the graphical interface demands that kind of performance," said Roy Folk, vice-president of software products at Ashton-Tate Corp.

If the 80286 does not deliver the punch needed for advanced versions of OS/2, observers said, IBM could have some angry PS/2 users on its hands.

IBM has been selling its PS/2 Models 50 and 60 as the machines that will run the operating system of the future. Analysts, however, said they are skeptical about whether that will include the Presentation Manager and Extended Edition.

The Model 80 is the only member of the PS/2 line outfitted with an 80386. But only about 10% of the PS/2s sold to date have been Model 80s, according to research firm Interna-

tional Data Corp. (IDC). "Anybody who bought lower than a Model 80 is almost certainly in for a disappointment," said William Zachmann, senior vice-president of research at IDC.

Despite the financial penalties, some users said the trade-off is worth it.

"There is some risk in all of this, but we have confidence it will give us added productivity and better decision making," said Joseph Brophy, senior vice-president at The Travelers Corp. Brophy said he expects 10% of the 20,000 DOS users at Travelers to migrate to OS/2 within a year of the anticipated introduction of Extended Edition 1.1 in November.

Bendix's Danielson predicted that about 70% of his PC users will be running OS/2 by 1990.

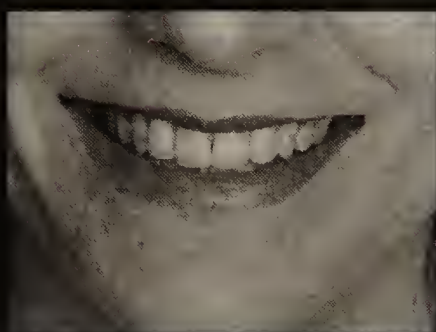
The bottom line

System expansion required to run OS/2 is expected to dramatically boost single-user costs

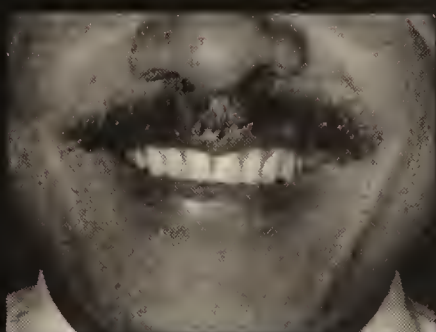
	IBM Personal Computer		IBM Personal System/2		
	XT Model 286	AT	Model 50	Model 60	Model 80
Processor	Intel 80286	80286	80286	80286	Intel 80386
Standard memory	512K bytes	512K bytes	1M byte	1M byte	2M bytes
IBM color monitor	\$685	\$685	\$685	\$685	\$685
IBM Video Graphics Array card	\$595	\$595	Standard	Standard	Standard
Additional memory	2M bytes: \$1,240 to \$1,350; 4M bytes: \$2,665 to \$2,955	2M bytes: \$1,240 to \$1,350; 4M bytes: \$2,665 to \$2,955	2M bytes: \$1,040; 3M bytes: \$1,750	2M bytes: \$1,040; 3M bytes: \$1,750	2M bytes: \$2,890; Additional megabytes \$1,295 each
OS/2 Standard Edition Version 1.1	\$325	\$325	\$325	\$325	\$325
OS/2 Extended Edition Version 1.1	\$795	\$795	\$795	\$795	\$795
Mouse (optional)	\$175	\$175	\$195	\$195	\$195

INFORMATION PROVIDED BY RETAIL LIST PRICING OF IBM EQUIPMENT AND POPULAR PRODUCTS FROM OTHER VENDORS
CW CHART

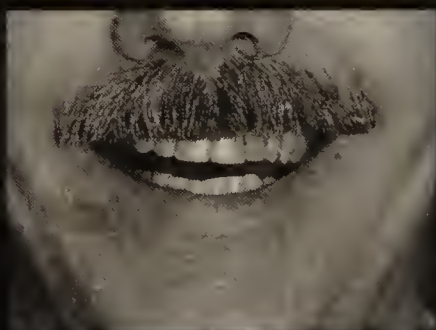
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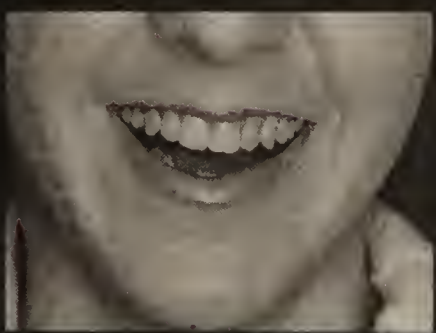


"My pen ran out of ink."

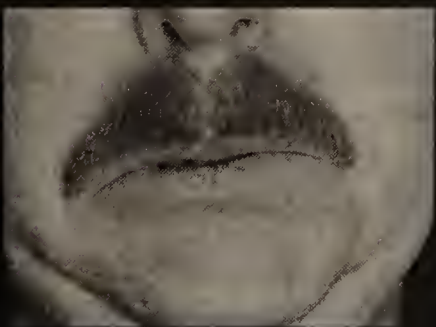
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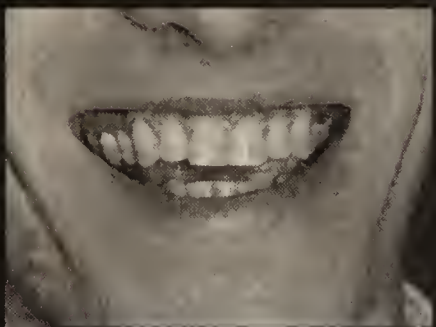
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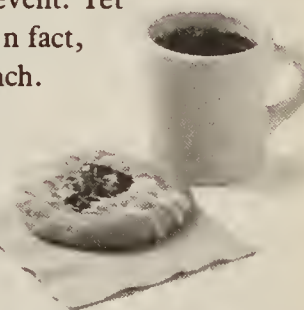
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U.S. delays sanctions; Brazil revising policies

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Reagan administration postponed trade sanctions against Brazil last week amid signs that Brazil is revising some of the computer and software policies that triggered the threat of U.S. retaliation.

It appears that U.S. negotiations with Brazil are going favorably, and the U.S. does not want to disrupt that progress, according to Charlotte LeGates, a spokeswoman for the Computer and Business Equipment Manufacturers Association.

U.S. Trade Representative Clayton Yeutter said the sanctions will be postponed at least until April 19, when Brazil is expected to issue regulations covering software imports and copyright protection. If the regulations satisfy U.S. concerns, sanctions may not be necessary, a spokesman said.

The U.S. wants to ensure that the regulations do not impose unfair tariffs or software import restrictions, sources

said. Last November, President Reagan proposed \$105 million in tariffs against Brazilian products, charging that Brazil was discriminating against U.S. computer and software products and failing to protect software copyrights [CW, Nov. 30, 1987].

Mending fences

Since then, Brazil has passed a software copyright law and relaxed its 1987 decision blocking the sale of Microsoft Corp.'s MS-DOS. In a major concession, Brazil said it will permit the sale of MS-DOS 3.3 because there is no Brazilian equivalent. It will not, however, permit sales of the earlier MS-DOS 3.2, because an equivalent product is sold by Brazil's Scopus Tecnologia SA.

There are also reports that Brazil has rejected a plan by Unifon SA to make a clone of Apple Computer, Inc.'s Macintosh, according to LeGates.

"There was a lot of dismay and disgust in December about the lack of progress in this situation, but that mood has really changed" after the recent developments, LeGates said.

Ardent joins downsized supercomputer fray

BY JULIE PITTA
CW STAFF

SAN FRANCISCO — Ardent Computer Corp. last week launched its "graphics supercomputer," a system positioned to bridge the gap between high-end workstations and minisupercomputers.

Introduction of the system coincides with the debut of a similar system from Apollo Computer, Inc. In addition, Newton, Mass.-based start-up Stellar Computer, Inc. is scheduled to formally introduce a third system in this class early next week.

Despite claims made by Ardent, Apollo and Stellar, it appears that the distinctions among the three products remain cloudy.

"They're all aimed at the same market," said Omri Serlin, president of Itom International, Inc., a Los Altos, Calif., market research firm. "The way the companies have arrived at the design is somewhat different. But who cares? The proof will be the performance on user applications."

Ardent's Titan uses 64-bit parallel vector architecture, like that found in supercomputers

like Cray Research, Inc.'s X-MP. Peak processing rate on the machine has been tested at 64 million floating-point operations per second. In addition, graphics processing performance has been measured at 200,000 full-color three-dimensional polygons per second.

'Shrunken-down Cray'

Gordon Bell, Ardent's vice-president of engineering, research and development and one-time developer of Digital Equipment Corp.'s VAX architecture, called the Titan "a shrunken-down Cray."

The Titan is said to be targeted at single users requiring high-speed number-crunching and high-performance graphics capabilities as well as visualization.

Ardent says it expects the system to be used by research scientists in the computational physics, chemistry fluid dynamics and mechanical computer-aided engineering areas, along with other scientific fields.

Ardent has signed a number of customers for its system, including Westinghouse Electric Corp., General Motors Co., Eastman Kodak Co. and MIT.

A limited number of single- and dual-processor versions

have been shipped to selected customers. Three- and four-processor versions are scheduled for shipment in the fourth quarter of this year.

Cheap seats

Of the three systems, Apollo's appears to be the more general-purpose one. Both Ardent and Stellar's systems offer higher performance graphics capabilities. Ardent's Titan is built around off-the-shelf components, while Stellar's is more proprietary in nature.

Jeffrey Canin, industry analyst at Hambrecht & Quist, said the Ardent system will appeal to users who cannot afford the price of a minisupercomputer but require that level of performance.

Pricing for the Titan begins at \$79,000 for a single-processor version and peaks at \$150,000 for a full-function, four-processor version.

Performance of the system, as stated by Ardent, is "impressive when compared with both lower priced workstations and minisupercomputers."

"It's a new class of system. The controversial issue is how large a class it will be," Canin maintained.

60 MIPS

FROM PAGE 1

Inc. is scheduled to bring out its supercomputing workstation, and industry sources predict an imminent entry from Silicon Graphics, Inc.

Apollo's reduced instruction set computing-based Series 10000 "has definitely raised the bar for the competition and set the groundwork for a new class of computers," said David Burdick, an analyst at San Jose, Calif.-based Dataquest, Inc.

This new class, deskside models able to perform calculations at speeds formerly reserved for supercomputers, is targeted at exceptionally compute-intensive applications that require supercomputer clout.

Tuning trouble

In computational fluid dynamics, for example, users trying to simulate air flow "have to send their computations off to a Cray or a superminicomputer and then postprocess them on the workstation to manipulate the results," said Apollo high-end senior product marketing manager Paul Bemis. "The two-step process usually takes overnight, not to mention the loss in interactivity. Imagine trying to tune your radio if you couldn't hear the sound until later."

The Series 10000 is the first implementation of Apollo's Parallel Reduced Instruction Set

Multiprocessing, or Prism, architecture. Able to be deployed as either a computational workstation or a network server, it wraps up to four processors, 8M to 128M bytes of main memory and up to 3G bytes of local storage into a box the size of a file cabinet.

The combination, according to Apollo, yields a workstation that can deliver 15 to 30 million

APOLLO is "playing at a distinct advantage: They have a large established customer base and a third-party software base. Ardent and Stellar have neither."

DONALD BELLAMY
INTERNATIONAL DATA
CORP.

instructions per second (MIPS) with one processor and 60 to 100 MIPS in a four-processor configuration.

In a series of performance benchmarks run on similarly configured machines, the Apollo machine delivered more than 10 times the total throughput of Hewlett-Packard Co. and Sun Microsystems, Inc. high-end workstations, Apollo said. Prices for the package range from just

under \$70,000 to \$139,900.

Despite what some see as a black hole in Apollo's offering — a three-dimensional graphics component will not be announced until the third or fourth quarter — the Prism and Series 10000 introduction should boost Apollo well into the front ranks of competitors in the new market niche, said Donald Bellomy, an analyst at International Data Corp. in Framingham, Mass.

"Once they've got the graphics component, they're playing in a whole new ballpark," Bellomy noted. "And they're playing at a distinct advantage: They have a large established customer base and a third-party software base. Ardent and Stellar have neither."

As of year-end 1987, Apollo's 54,000 installations accounted for 25% of the workstation market, according to Bellomy.

The Personal Supercomputer series is source code- and binary data-compatible with all Apollo products, giving users access to some 1,800 applications, the firm said. It runs on Apollo's Domain/OS, which offers the choice of the University of California at Berkeley's Unix 4.3; AT&T's Unix System V, Release 3; or both simultaneously.

How the supercomputing workstation market will be carved, analysts noted, is not as big a question as how much of a market there is to carve.

"There's a market for these boxes, but it's limited in size,"

Workaholics' dream machines

Apollo and Ardent claim minisupercomputer performance for latest workstation products

	Apollo Domain 10000	Ardent Titan
Performance	60 MIPS¹ integer 9 MFLOPS² standard Linpack benchmark (single precision) 5 MFLOPS standard Linpack benchmark (double precision)	40 MIPS integer 6 MFLOPS compiled Linpack benchmark
Memory	8M to 128M bytes 150M byte/sec., 64-bit synchronous bus bandwidth	8M to 128M bytes 256M byte/sec. bus bandwidth
Operating system	Domain/OS, which includes Unix support	AT&T Unix System V, Release 3.1
Price	\$69,900 to \$139,900	\$79,000 to \$150,000
Delivery	Third quarter	Fourth quarter

¹ Millions of instructions per second

² Millions of floating-point operations per second

INFORMATION PROVIDED BY APOLLO COMPUTER, INC. AND ARDENT COMPUTER CORP.
CW CHART

said Russell Crabs, an analyst at Stamford, Conn.-based Gartner Securities Corp.

Dataquest's Burdick said he views it as "not yet a market, but a major new market niche. We're starting to see evidence that people want supercomputer speed and graphics at workstation prices."

The Prism announcement could increase Apollo's standing in the traditional workstation market, Burdick added. "Sun was there first with the Unix standard with open architecture," he said. "This time, Apollo is first."

CORRECTIONS

The Software Productivity Consortium plans to offer its products [CW, Feb. 15] only to consortium members.

Microway, Inc.'s NDP Fortran-386 compiler is for use with Intel Corp. 80386-based systems [CW, Dec. 14, 1987].

Fastcomm Communications Corp.'s FDX 2448 is a V.22 bis modem capable of communicating synchronously or asynchronously [CW, Jan. 25].

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Mac II to speak with LISP in TI pact

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. announced last week that its Macintosh II will be packaged with a LISP microprocessor and sold by Texas Instruments, Inc. as an artificial in-

telligence system.

In other news last week, Apple announced it had bought Network Innovations Corp., a communications software developer, and also opened up its Appletalk network to the Apple IIE and Apple IIGS systems.

TI's Data Systems Group will

resell the Macintosh II, to which it will add its internally developed coprocessor board based on its LISP microprocessor and Explorer software environment for artificial intelligence development to the Mac II.

The Macintosh II, to be called the Micro-Explorer, will share

the Apple and TI logos, marking the first time both companies have participated in a joint development agreement. The system will allow for the development of symbolic processing applications such as expert systems and will also run traditional Macintosh applications.

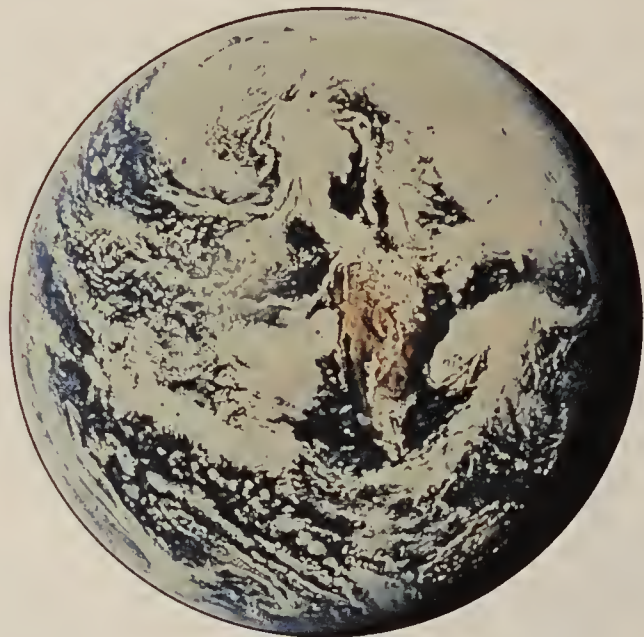
Pricing for the system is set to begin at \$14,995, which includes a Mac II with 2M bytes of

random-access memory, a 40M-byte hard disk drive, the Micro-Explorer coprocessor board and a runtime version of the Explorer software environment. Deliveries are scheduled for the second quarter of this year.

No big deal?

Industry watchers said the agreement represents a minor opportunity for Apple. "It won't represent that great a market for Apple," said Michael Orsak, an industry analyst at Robertson, Colman & Stephens. "Not that many people need a LISP processor."

Network Innovations, a Cupertino, Calif.-based developer of communications software



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NOT THAT many people need a LISP processor."

MICHAEL ORSAK
ROBERTSON, COLMAN &
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products, was purchased by Apple for an undisclosed price.

At last month's Dexpo East '88 show, Network Innovations and its product CL/1, a connectivity language that allows the development of applications for connecting Macintoshes to Digital Equipment Corp. VAXs, received praise from Apple Chairman and Chief Executive Officer John Sculley. Earlier this year, Apple and DEC said they will work together to ease the connection of Macintoshes to VAXs.

Apple said Network Innovations will initially concentrate on the Mac-to-VAX products, later moving to products that connect Macintoshes to IBM mainframe data bases.

According to officials at both companies, Network Innovations will remain independent of Apple, retaining its own management team and headquarters. Apple representatives will sit on the Network Innovations board.

In a move to bring the Apple IIE and IIGS product families in line with the needs of corporate America, Apple said it has decided to offer networking links from these lower priced machines into the Appletalk network. This is expected to benefit mainly Apple IIE and IIGS users in the education and small business markets.

The links include an enhanced Appleshare file server at \$799 and Appleshare print server at \$299; a \$249 Apple II Workstation Card; and two versions of the \$99 Apple IIGS Workstation Software package, one for the file server and one for the Apple IIGS.

Users can hook into the Appletalk network through LocalTalk serial cable for access to the Appleshare server and LaserWriter printers, Apple said.



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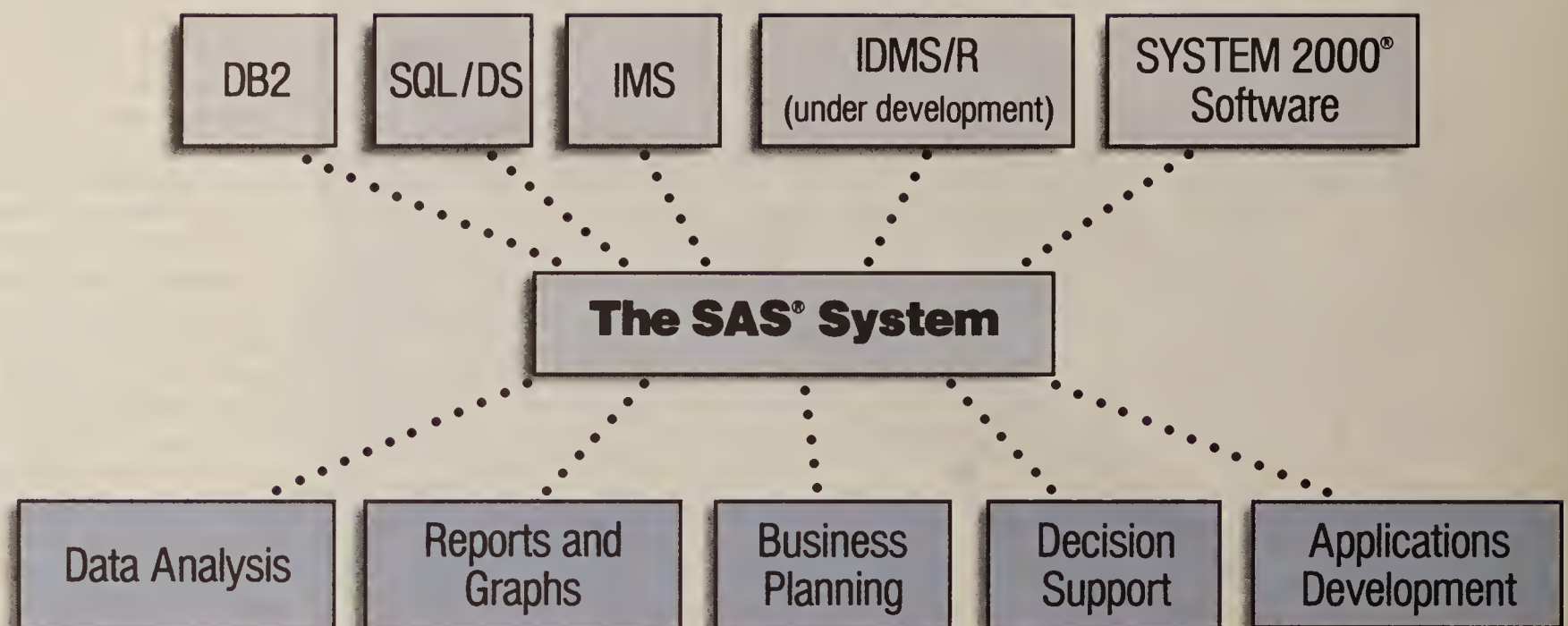
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DB2 INTERFACE DATA EXTRACTION PANEL

TABLE NAME: DB2.PERSONNEL
SAS DATA SET: PERS.SUBSET

COMMAND==>

FUNC	COLUMN NAME	SAS NAME	FORMAT
***	TABLE: PERSONNEL	***	COLUMNS 14 * SELECTED
1	LASTNAME	LASTNAME	\$10.
2	FIRSTNAME	FIRSTNAME	\$10.
3	MIDINIT	MIDINIT	\$2.
4	ADDRESS	ADDRESS	\$20.
5	CITY	CITY	\$20.
6	STATE	STATE	\$2.
7	ZIP	ZIP	\$10.
8	PHONE	PHONE	\$13.
9	SSN	SSN	\$11.
10	HIREDATE	HIREDATE	\$10.
11	DEPTCODE	DEPTCODE	\$7.
12	SUPERVIS	SUPERVIS	\$10.
13	DIVISION	DIVISION	\$10.
14	TITLE	TITLE	\$15.

----- WHERE CLAUSE -----

city = baltimore_



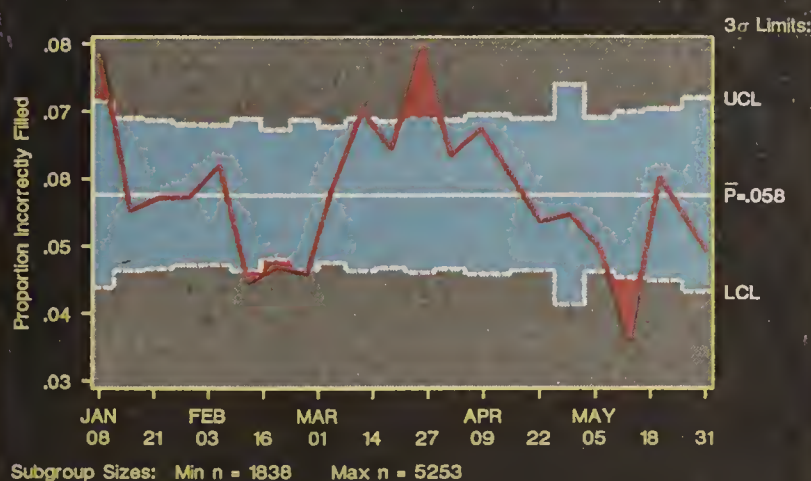
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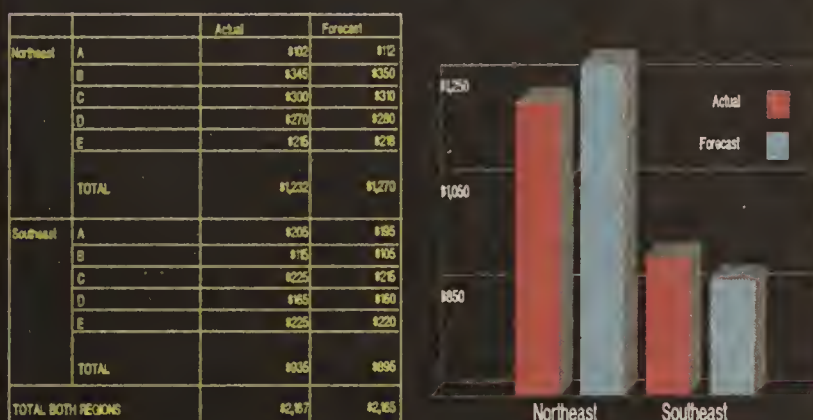
Morgan Cosmetics Inc. P Chart for Perfume Bottle Capacity



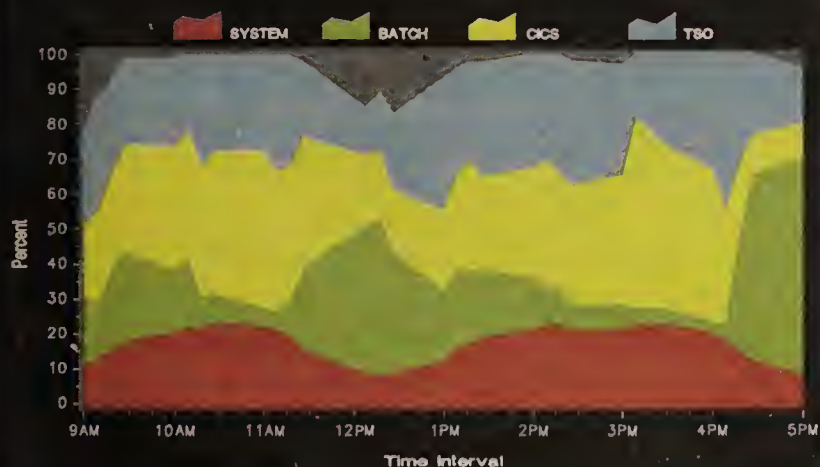
EMS Software International Countries with Products Installed As of January 1, 1987



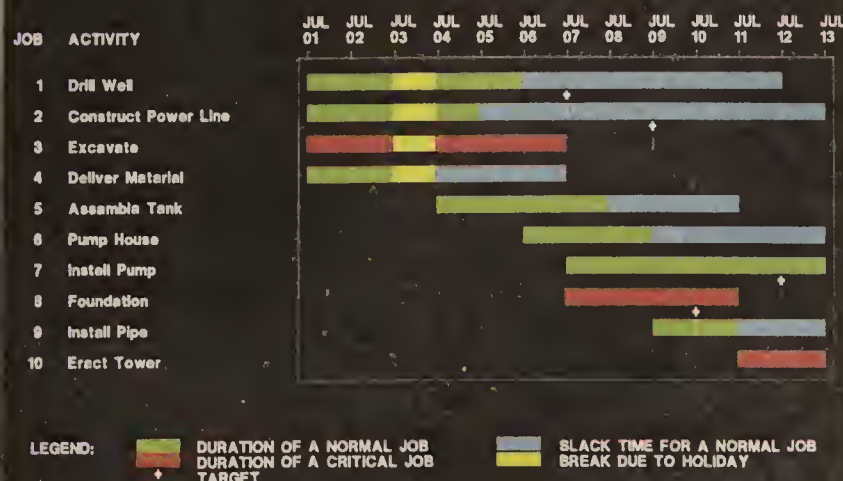
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Sneak peek for PS/2 clone

BY JULIE PITTA
CW STAFF

SAN JOSE, Calif. — Chips and Technologies, Inc. last week previewed the first running prototype of a system the firm claimed is compatible with the Micro Channel architecture of IBM's Personal System/2.

Chips and Technologies has developed a chip set said to be compatible with the Micro Channel and has offered it to systems vendors as the basis of cloning the PS/2.

However, company officials said last week it is still unclear what the legal implications will be for cloning IBM's proprietary technology.

The first samples of the seven-chip set are scheduled to be shipped to between 50 and 100 OEM customers this month, according to Raj Jaswa, product marketing manager for Chips/250, believed to be the first available Micro Channel-compatible chip set. Volume production of Chips/250 is scheduled for late June, Jaswa said.

He predicted that systems compatible with the PS/2 Models 50 and 60 — both Intel Corp. 80286-based systems — will hit the market as soon as the second quarter.

And Tandy, too

According to some sources, Tandy Corp. has designed a board layout for a Micro Channel-compatible machine and is expecting the Chips/250 chip set by late this month. Tandy will ship prototypes of a PS/2 compatible to select dealers by mid-April, the sources said.

Chips and Technologies has been negotiating a licensing

agreement with IBM for the last six months, Jaswa said. However, the firms have failed to reach an agreement.

"We are willing to pay any license fees to anyone we infringe upon," Jaswa said. "We've told IBM to just send us the bill."

Chips and Technologies said its chip set will allow system vendors to improve on the performance of the PS/2 Models 50 and 60. In Microsoft Corp. MS-DOS-based applications, the Chips and Technologies prototype is running 50% faster than

the 10-MHz Models 50 and 60, Jaswa said. Chips and Technologies expects to double that to 20 MHz before a final version of the chip set is released.

While IBM's wait-state memory cycle is measured at one, Chips and Technologies has tested its prototype at 0.5 to 0.7, Jaswa maintained.

Testing remains preliminary. So far, Chips and Technologies

has tested 10 MS-DOS-based software programs, including widely used packages such as Lotus Development Corp.'s 1-2-3. Additionally, it has tested three add-in boards — Intel's Above Board and IBM's ST506 hard-disk controller and dual asynchronous card.

Chips and Technologies said it will begin testing IBM's OS/2 on the prototype shortly.

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Migent tool clears legal hurdles

BY DOUGLAS BARNEY
CW STAFF

INCLINE VILLAGE, Nev. — It's a year late and a bit scaled down, but later this month, Migent, Inc. should finally ship Emerald Bay, a data base product written by Ashton-Tate Corp.

Dbase author Wayne C. Ratliff. The product was originally scheduled to ship in the first quarter of last year and was set to include a Dbase-compatible front end. But an Ashton-Tate lawsuit alleging trade secret violations disrupted the development effort, according to Ratliff,

who formerly served as Ashton-Tate's chief scientist. "It has been a sad story, complicated by the lawsuit," said Ratliff, who has been developing the product under contract for Migent.

In compliance with a settlement agreement between Migent and Ashton-Tate, the re-

sulting product will not be entirely compatible with Dbase. Instead, there will be a front end, called Eagle, designed to be similar to, but different from, Dbase.

"It is not a clone, but if you know Dbase, you can learn Eagle in literally a few minutes. You can also convert programs quickly, but this is done manually," Ratliff explained.

The product is said to include

an import and export feature called Rosetta that allows Dbase and other types of data to be used with the system.

Migent also planned to include SQL as a key part of the product, but that did not happen. A key SQL programmer working for Ratliff defected to Borland International, pushing the SQL implementation back. SQL may be part of an update this summer, according to Ratliff.

Migent had also planned to ship a multiuser network version of the product. That did not happen; local-area network support is slated to be part of a follow-on update.

Migent had originally intended to promote its Ability integrated spreadsheet as another front end. But as with LAN support and SQL, users will have to wait for a product update that supports Ability.

The product reportedly will run under Microsoft Corp.'s MS-DOS. Prices were not available at press time.

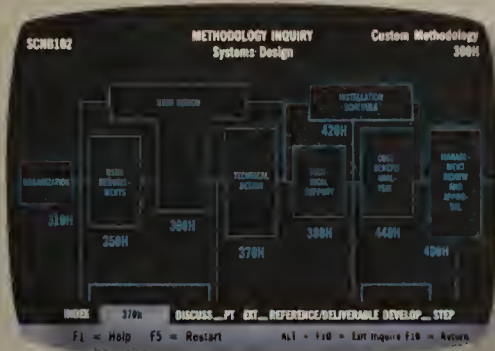
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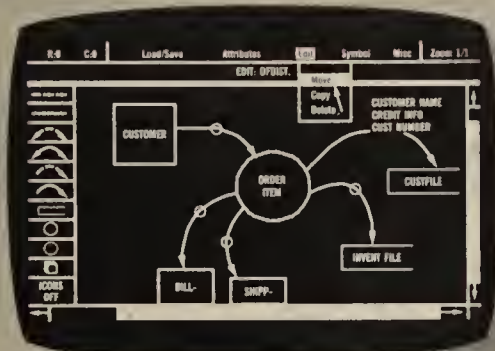
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```
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                                RELATIONSHIP LIST      04/28/87

ENTITY TYPE      DESCRIPTION      REL. INSTRUCTIONS      STATUS
ITEM ID          DESCRIPTION      ORDER DATA      CHILDREN LIST

DEPTITEM 10000001 CONTAINS 1 CUSTOMER-NAME S
DEPTITEM 10000002 CONTAINS 2 PROMISED-DATE S
DEPTITEM 10000003 CONTAINS 3 ORDER-DATE S
DEPTITEM 10000004 CONTAINS 4 SHIP-TERMS-CODE S
DEPTITEM 10000005 CONTAINS 5 SHIP-TO-ADDR-1 S
DEPTITEM 10000006 CONTAINS 6 SHIP-TO-ADDR-2 S
DEPTITEM 10000007 CONTAINS 7 SHIP-TO-ADDR-3 S
DEPTITEM 10000008 CONTAINS 8 SHIP-TO-ADDR-4 S
DEPTITEM 10000009 CONTAINS 9 SHIP-TO-ADDR-5 S
DEPTITEM 10000010 CONTAINS 10 SHIP-TO-ADDR-6 S

SEARCH:
01-HOLD 02-ITEM DETAIL 03-END 04-FIRST 05-DELETE
06-DOWNWARD 07-CANCEL 08-PROCESS 09-RETURN
10-UPWARD 11-TEXT FUNCTION 12-HELP 13-EXIT
```

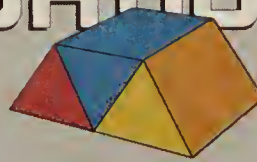
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Motorola to nab Unix V

SCHAUMBURG, Ill. — Motorola, Inc. last week said it is about to sign a deal with AT&T that will ensure the company early access to upcoming releases of Unix System V.

However, an AT&T spokesman said its relationship with Motorola is no different from the verbal agreements it has with other hardware suppliers.

"We have made agreements with other vendors, not just Motorola, to make sure they get beta copies as early as possible," the AT&T spokesman said.

Motorola's announcement is the latest move in its push for the Unix market. The company also signed an agreement last week with the Unisoft Group, the parent company of Unisoft Corp.

Under terms of the agreement, Unisoft will provide the Unix ports for Motorola's 68000 and 88000 platforms.

At the Uniform 1988 trade show last month, Motorola and Unisoft launched the latest standards effort in the Unix market by announcing the Unix Binary Compatibility Standard for Motorola microprocessors.

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 - 23. Dir., Mgr., Suprv., Analyst, of Systems
 - 31. Dir., Mgr., Suprv., of Programming
 - 32. Programmer, Methods Analyst
 - 35. Dir., Mgr., Suprv., O&WP
 - 38. Data Comm. Network/Systems Mgt.

OTHER COMPANY MANAGEMENT

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 - 12. Vice President/Asst. VP
 - 13. Treasurer, Controller, Financial Officer
 - 41. Engineering Scientific, R&D, Tech. Mgt
 - 51. Sales/Mktg. Mgt.
- OTHER PROFESSIONALS

 - 60. Consulting Mgt
 - 70. Medical, Legal, Accounting Mgt
 - 80. Educators, Journalists, Librarians, Students
 - 90. Others _____

(Please specify)

3. COMPUTER INVOLVEMENT (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant

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 - B. Minicomputers/Small Business Computers
 - C. Microcomputers/Desktops
 - D. Communications Systems
 - E. Office Automation Systems
 - F. No Computer Involvement

System challenges 3088

Data Switch says channel-based 9088 supports 4.5M byte/sec.

BY ELISABETH HORWITT
CW STAFF

SHELTON, Conn. — Data Switch Corp. last week took aim at IBM's Model 3088 with a competing channel-based host networking system that is said to support data transfer rates of up to 4.5M byte/sec. for up to 16 mainframes.

The Model 9088 Multisystem Interconnect Unit targets corporate sites in which multiple hosts must regularly exchange large amounts of data, according to Data Switch product manager of Hostnet systems Neil J. Unger. For example, it could be used in a distributed processing environment in which multiple hosts cooperatively perform subtasks within one large job or where they trade off different jobs to balance the work load, he said.

The 9088 also can provide information sharing among logical processors created by IBM's MVS/ESA operating system within a 3090 mainframe, he added.

Avoiding bottlenecks

Consultant David Passmore said he could not think of many instances in which companies had enough hosts in one place to justify the 9088. "Or if they do," he added, "they use front-end processors because most of the communications is terminal-to-host." Passmore, a principal at Fairvax, Va., consulting company Network Strategies, Inc., said many of his customers want to directly channel-attach their mainframes, "but this is primarily as a way to avoid the front-end pro-

cessor bottleneck when connecting multiple host sites over distance."

An entry-level 9088 with two internal data paths can be upgraded in two-channel increments to six data paths that can support communications among up to 16 IBM hosts, according to Data Switch. In contrast, up to eight hosts share only two data channels on an IBM 3088, "which can slow real throughput down to 1.2M byte/sec. when there is a lot of contention and handshaking between hosts," Data Switch's Unger said.

IBM was unavailable for comment.

Data Switch further boosted the 9088's throughput by assigning a dedicated microprocessor to handle I/O for each host channel adapter. In applications, such as bulk file transfer, in which handshaking is minimal, a 9088 network "approaches the 4.5M byte/sec. host channel speed" between two hosts, Unger said.

The 9088 is said to handle up to 512 addresses per data channel and to support all access methods for channel-to-channel communications without the need to modify mainframe operating system or application software. Transaction programs supported include LU6.2, JES2/NJE, Bulk Data Transfer and IBM's Intersystem Communication and Multiple System Coupling. Both data streaming and D.C.-Interlock modes are supported.

The product supports 3M-byte and, optionally, 4.5M-byte channels for IBM's 4300- and 3080-class computers. It is set to ship in April, with prices starting at \$65,000 for a two-channel unit.

MSA rocked by resignations of top-level execs

A top-level shake-up is under way at Management Science America, Inc. (MSA) as two of that firm's top technology executives and a senior vice-president for sales resigned recently.

Dennis Vohs, former director of development at MSA and most recently president of its Advanced Manufacturing, Inc. subsidiary, resigned after 17 years with the company.

Vohs told *Computerworld* that MSA was consolidating the sales and development efforts of his unit back into the corporate fold and that he opposed the move. After talks with top management, Vohs said he decided "it would be best if I left."

Vohs called the parting "very amicable" and said he is looking for an equity position with a venture capital-backed firm. The new director of development at the manufacturing unit is Michael O. Hunt, who will also continue as president of MSA International, Inc.

Also departing is Larry Smart, senior vice-president of technology.

MSA's director of public relations, Denise Fields-O'Connor, also recently resigned, as did Jeff Fisher, former senior vice-president of sales.

Users blast FCC access charge proposal for private networks

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Network users groups last week told the Federal Communications Commission that its proposal to impose switched access charges on certain private networks is unworkable and simply not necessary.

Furthermore, they denied accusations that there is widespread cheating by users to avoid the current \$25 monthly surcharge on private lines.

"There is no problem which requires fixing," said the filing by the Ad Hoc Telecommunications Users Committee, which includes firms such as American Airlines, American Express Co., Ford Motor Co., General Electric Co. and Sears Roebuck & Co.

Similar comments were filed by the International Communications Association (ICA) and the Committee of Corporate Telecommunications Users in the proceeding, which is intended to determine whether private-line users pay their fair share of the costs of using the local telephone exchange [CW, Nov. 30, 1987].

The FCC last November revisited its policy toward private interstate networks that "leak" traffic from private branch exchanges (PBX) into the local telephone network. The commission now levies a flat \$25 surcharge to roughly cover the costs of these off-network calls, but it is searching for a more accurate way to apply switched access charges.

The FCC said recent advances in digital PBX and Centrex switches suggest that off-network calls could be identified and measured for applying access charges. But the users groups said that neither the local exchange carriers nor the users have switches capable of accurately measuring leaked traffic and that adding the capability would be too costly.

Although the users supported the surcharge method, they said the \$25 figure is

too high and should be reduced to reflect the 60% drop in carrier access charges — or that it should perhaps be eliminated. The ad hoc committee recommended that the surcharge be cut to \$10.

Users can obtain an exemption from the \$25 surcharge by self-certifying that they do not leak traffic into the local exchange. But the FCC said it suspects the exemption "has been and continues to be abused by some and may contribute to the low level of actual revenues collected by the surcharge."

Revenue from the surcharge has dwindled from \$147 million in 1986 to \$114 million in 1987 and an estimated \$88 million this year, far less than the FCC anticipated.

Allegation denied

Taking umbrage at the allegation that widespread cheating accounts for the revenue drop, the ad hoc committee and other users attributed the decline to FCC policies that have encouraged the direct use of the switched network and the fact that newly installed data links are likely to be exempt from the surcharge.

The so-called "leaky PBX phenomenon" is rapidly disappearing, the users groups said, for two main reasons:

- Rates for switched services used by large businesses have declined, due to lower access charges and the introduction of low-priced carrier services. This reduces the incentive to leak off-network traffic through a PBX because it encourages the direct use of switched networks.
- Data communications is now growing faster than voice communications, and most data traffic uses private-line rather than dial-up connections.

"It would be grossly inefficient to require existing switching devices to be upgraded for the sole purpose of measuring leakage, because both leakage and the need for the surcharge are declining," the ICA's filing said.

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EDITORIAL

Clear but cloudy

DOESN'T IT SEEM like just yesterday that the clouds of impending recession, maybe even depression, were gathering? Wasn't it earlier this winter that many of the finest minds in the economic prognostication business insisted that a radical change for the worse was a *fait accompli*, following the tornado that devastated the stock market last October?

And along with these gloomy predictions came all sorts of advice about battening down the hatches. But after reading last week's reports on the present state of economic soothsaying, the question arises, Does anyone have a barometer that works?

First came the results of a survey conducted by the University of Michigan, which concluded that Americans see a strong economy ahead, thus providing "further evidence that a recession isn't likely this year," according to one newspaper report.

Then the U.S. Department of Commerce revised its Leading Economic Indicators for December. (We're not sure why, but in doing so, the indicators broke a string of two consecutive months of decline; three in a row signals *recession* in economists' parlors.)

In addition, the Dow was climbing toward the 2,100 mark. So everything's fine with the world, and we can pretty much forget about deficits and crashes and the fact that the White House guard will change in 10 months, right?

Hold on a minute. The Michigan study also showed that the number of U.S. households that fear a worsening long-term economic picture is increasing — fairly rapidly.

The U.S. Department of Labor recently released figures that signal a worsening inflationary outlook. And one of the most respected stock-fund managers in the country has begun to aggressively move away from the equity markets and into bonds and cash.

Through all this seemingly contradictory data, the one fact that stands clear is that Wall Street, the business media and the American public is inexorably fixated on the short term. The problem with this myopia is that well-hatched business plans, especially information systems strategies in today's environment, must focus on the medium and long term.

Therefore, it is worthwhile to repeat a message to information professionals that ran in this space shortly after Black Monday.

First, assume modest economic growth for this year — it's an election year, so nothing drastic will happen — and develop contingencies to long-term plans should the economy really sour next year.

Stick to pre-established long-term systems plans, but be wary of commitments to projects that assume or require a favorable business climate extending into the early 1990s.

Assume that, in this day of mass media, the greatest determinant of economic ebbs and flows may be human emotion, and that is imminently unpredictable.



LETTERS TO THE EDITOR

More sound and fury over Section 1706

As a certified public accountant and senior partner of my firm, I found the story "Independents' backs to the barricades" to be inaccurate [CW, Feb. 1].

I would caution your readers to properly classify their workers and not count on any agreement with a third-party vendor to limit their liability from an Internal Revenue Service assessment of withholding taxes. I also suggest that readers audit their vendors for compliance, because the IRS will not do it for them.

John J. Cameron
Zusman, Cameron & Allmon
Certified Public
Accountants, Inc.
Palos Verdes, Calif.

Regarding the new rules and tests that are set to be introduced in the federal legislature, they should also include a Pinocchio test to be given to the independents. The questions could simply be: "Do you have a unique skill?" and "Are tax deductions the most important considerations for being an independent contractor?"

The Internal Revenue Service could then make a field trip to MIS shops and rank people by the size of their noses. You could bet they would be busy. Let's give a similar test of honesty to their vendors for co-liability, and the U.S. deficit could be reduced.

George H. Moilanen

I was disappointed to read the one-sided view regarding the position of independent contractors in the article "Independents' backs to the barricades." I would have expected a publication of your caliber to provide a more balanced viewpoint to its readers on an issue of such im-

portance to the software services industry.

Accordingly, I hope you will see fit to print the other side of the argument together with the relevant facts.

Roy Kiszka
President
CP Information Systems, Inc.
New York

The story "Independents' backs to the barricades" did not provide any substance or really reflect any current events. If you are going to spotlight a story from a lawyer and the brokers, you should also provide one from a lawyer and the professional services companies.

Jack Hines from New York Life Insurance Co. is probably right when he said this issue is good for the lawyers. I might just be right when I say *Computerworld* has encouraged a fox to write a story about how to guard the chicken coop.

John Mazza
Area Vice-President
Technical Aid Corp.
Oakland, Calif.

It appears as though a small special interest group is taking advantage of tax loopholes prior to the enactment of the 1986 Tax Reform Act, and they have convinced the author of "Independents' backs to the barricades" to champion their cause and stir up support for altering Section 1706. That article was totally misleading. The tax reform act did its job by closing many unfair loopholes. Let's not try to reopen them for the esoteric.

John F. Keane
President
Keane, Inc.
Boston

As a former aerospace administrator, I was responsible for coordinating activities by company programmers and programmers provided by technical service companies. It would be unjust if outside programmers performing the same function as in-house programmers were allowed to classify themselves as independent contractors and claim deductions not allowed to the rest of us. It appears *Computerworld* encourages special rules to classify some programmers as independents while asking others to pick up the tax tab. How unfair for a respected publication to print stories advocating special tax treatment for a select group.

Herbert G. Gale
Retired
Hughes Aircraft Co.
Oceanside, Calif.

How can independents have their backs to the barricade? When is the last time you saw MIS personnel not have systems to design or programs to write? Oh, you mean some personnel lost their employment-related tax write-offs. Well, I suppose they can get a job in fast food or pumping gas. Of course, if they are on the fringe, they can always continue their current job.

Joseph A. Post
Director of Project
Management
Zink & Katich, Inc.
Lansing, Ill.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Technosynthesis: Life after disks

CHARLES LECHT



The time between discovery of a new publications medium and its maturation to maximum utility can be great. The ancient Egyptians used papyrus, but it took several thousand years before paper reached the level of usefulness inspired by the invention of the printing press.

This pattern has been manifest since time immemorial: The ultimate usefulness of one invention awaits the discovery of another. Film had to await the movie camera; sound recording, tape; broadcast, video.

These days, the maturation time of newly discovered media in the publishing world is ever shortening. For example, computer disks — floppy, hard, optical and laser — are reaching ever increasing utility over shorter increments of time. Innovations in computer hardware and software are flowing into the marketplace at a rapid pace.

Innovations in optical-disk read/write technologies are creating soaring sales. Shipment

Lecht is an IDG News Service foreign correspondent based in Tokyo.

figures are astonishing, from 31,700 units in 1986 to 99,600 in 1987. In 1990, the number may reach 1.2 million.

Disk technologies should reach peak utility in the next five years. After that, their desirability as an I/O medium will begin to be eclipsed by that of massive direct-access, nonmoving, plug-in computer memories. Information now available for purchase on disk will be housed in these memories; the blank disk media will be replaced by blank, non-moving memory modules.

When the sun sets on disks

When the day of the disk is done at the turn of the century, computer technology will have shed the last of its moving parts to become ever more reliable and useful to us. The day that there are no longer moving parts in a computer system will herald the arrival of another — the day that the product of electronic publishing can itself be electronic.

Limitations in power availability, practical portability and so on in computers with moving parts have caused the role of computers in electronic publishing to thus far be essentially consigned to helping create old publishing media forms in new ways.

When the computer and its source of electrical power be-

come truly portable, it will find a new role as the medium itself. For example, there are a host of companies that are "publishing" — there may be no better word for it — computers containing language translation information that was heretofore only found in a classic text or possibly on a phonographic disk.

Examples of other uses of

computers as media abound. While these are primarily in the nature of small, hand-held devices of limited power, we can anticipate that they will soon begin to increase their capabilities in an essentially limitless way.

The use of a computer system to create new media publications and to aid us in obtaining the benefits that these bring will



BOB DAHM

doubtless offer people an exciting new experience. As the printing press was used to create books, the computer may create that which books promise to offer: experience.

Words dance off the page

I offer the book in its current form as a plateau from which we can proceed to gain a glimpse of how this could come about. Suppose that the pictures in books were capable of moving. If the pages were available on the display of a computer, getting them to move would be no big feat.

And suppose that we could somehow enter the moving picture scene to experience its content, leaving the world of words outside. It would be possible if the book were capable of producing three-dimensional holographic scenes and projecting them around us. The book would then offer us an experience as large as life itself — albeit an artificial experience.

The impact of artificial experience is staggering in its potential for improving the quality of our lives. It could so reduce our dependency on the written and spoken word that we might one day be free of the necessity to communicate using them.

A technosynthesis is at hand. We may forever be caused to wonder, as did the ancient Middle East scribe of *The Rubaiyat of Omar Khayyam*, "Who is the potter, pray, and who the pot?"

What's a mainframe, after all?

AMY WOHL



Users don't really care what you call a system. They care about what it does, what it costs, how easy it is to use and how well it integrates with information-providing devices already in use.

Historically, a mainframe was big physically, big in acquisition and operation costs and big in processing power. Today, we can find mainframes that are quite small, sometimes not so expensive and even less powerful than certain personal computers and minicomputers.

We need to stop measuring the physical size or raw performance of a computer and start looking more at the environment it requires, the support it demands and the functionality it provides. We need to look at the real cost of doing things — including items that appear on the organizational rather than the data processing department's

Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

bill, such as time lost working in an unfriendly environment.

We also need to understand the difference between continuing what we're doing because it makes ongoing economic sense and continuing what we're doing because familiar things seem less scary, particularly in complex and critical environments.

Learning to share

Early mainframe computers weren't designed around particular applications. We figured out for ourselves how to perform an increasing variety of tasks on whatever hardware platforms the computer industry supplied.

Today, that is less true: Mainframe applications increasingly tend to share certain characteristics, such as solving corporate-level problems.

Except for certain kinds of giant number-crunching applications, which might focus all of a mainframe's power on a single problem, most mainframe environments have been designed to permit multiple users to share the computer's considerable processing power. Applications that are processor hogs, such as what-you-see-is-what-you-get interfaces, graphics and so on, don't easily share multiuser

mainframe environments. They don't share single-processor environments of any size well, micro or mini or mainframe.

Mainframes generally use custom or highly customized software, most often created and maintained by the user organization's own expensive programming staff. In contrast, minicomputers and PCs depend, for a substantial part of their charm, on the abundant availability of turnkey, off-the-shelf software.

To make efficient use of their power and provide rich, flexible tools, mainframes often use complex, layered software that requires professional — DP professional, that is — administration and support. Minis and PCs often rely entirely on non-DP professionals for their care and usually do best with more straightforward approaches.

The mainframe design and programming philosophy has traditionally emphasized writing programs to make efficient use of a scarce resource. This tendency can lead to programs that run well but are difficult for end users to learn or use — and certainly not designed for users to modify. Minis may be similar but continue to try to move in a friendlier direction; PCs are spe-

cifically designed, particularly in their modern dress, to offer friendly interfaces and some user-accessible customization.

Note that size and speed don't seem to be the relevant measures here. We can get computing environments of equivalent sizes in single, large computers or by yoking multiple smaller machines together, provided we don't need to apply all of their combined power simultaneously

IN 10 or 15 years, we will be writing once again about the dangers of too much decentralization.

to the same part of a problem.

Instead, the relevant measures that differentiate systems today include the following:

- The complexity of the required supporting infrastructure and its cost.
- The amount of software available for different applications.
- The user's perception of the level of complexity a system represents and the level of complexity he's willing to handle.

A mainframe has not yet been reduced to being a giant MIPS-pusher. Contrary to industry ru-

mor, I have not yet suggested that the proper role of a mainframe is as a file server to a PC. But that day could come, as the power and the operating system of the mainframe is shrunk to fit within a very little box.

Be a conservationist

In the meantime, we need to look toward making good use of all of our resources, assigning the right applications to the right level of processor power, applications software availability and appropriate interface support.

Increasingly, doing so will mean interactive interfaces and personal productivity tools at the desk on micros; higher level tools under local control on bigger and bigger, but not necessarily more complex, minis; and organization-level tools on mainframes unless and until we find a better environment.

As more multiuser, multitasking environments — such as local-area networks, their operating systems, servers and LAN applications software — become available, it is inevitable that applications that today are done exclusively on mainframes will move to increasingly decentralized locations. In 10 or 15 years, we will be writing once again about the dangers of too much decentralization and the advantages of putting more of our eggs in bigger baskets.



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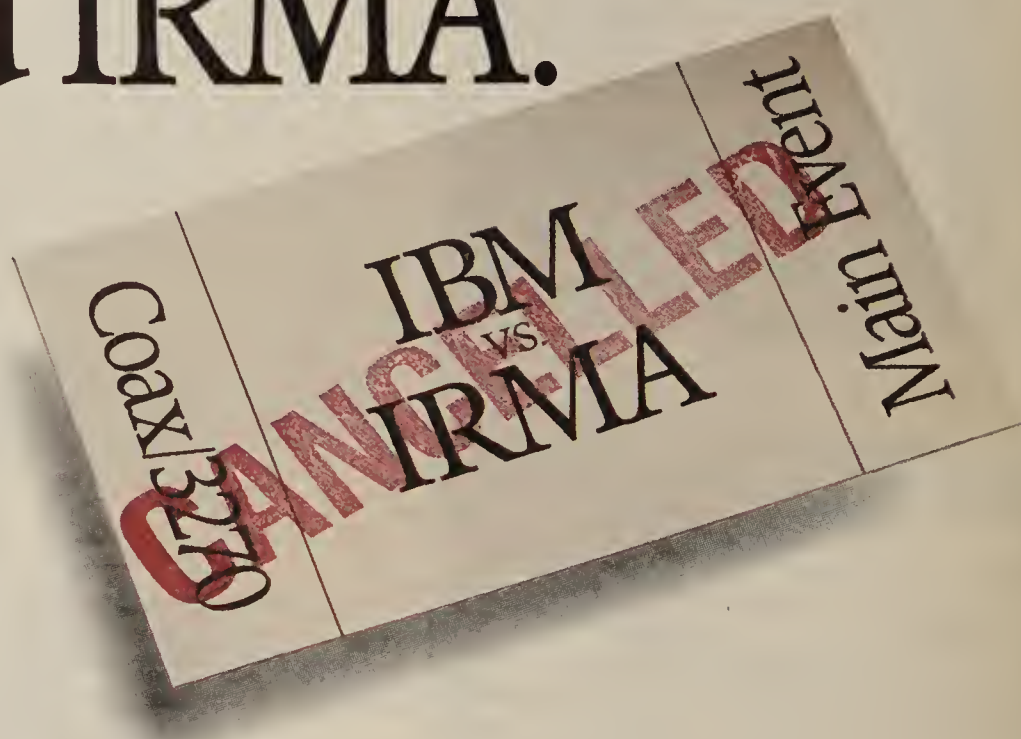
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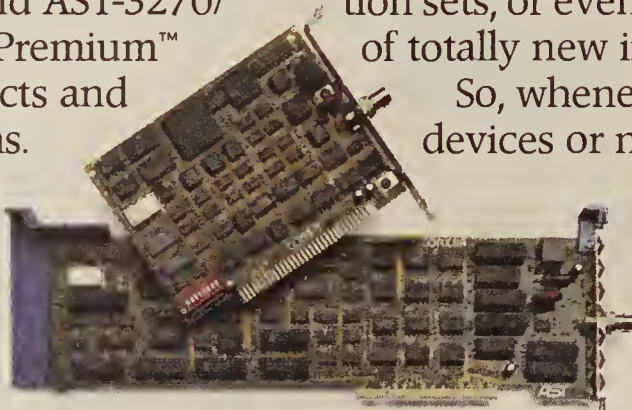
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COMPUTERWORLD 3/7/88



A defense of people in project productivity

Peopleware

By Tom DeMarco
and Timothy Lister

How can a project be judged successful if it meets back-breaking deadlines but half the staff quits after its completion?

This question sums up the authors' main line of reasoning: Don't rely on apparent results in assessing the productivity of a project team; measure the full impact on the company and the people.

DeMarco and Lister skewer conventional wisdom. They point out that Parkinson's Law — which says that work expands to fill the time allotted it — is not a

law like Newton's. Parkinson's Law, they say, "didn't catch on because it was so true. It caught on because it was funny." The authors suggest a revision: "Organizational busywork tends to expand to fill the working day."

The book is an unremitting defense of the people part of the productivity equation, backed by statistics and anecdotes.

One example: a study of the productivity of programmers measured according to different estimates of how much they should produce. The programmers were least productive when trying to meet a schedule set by their supervisors and

more productive when they set their own schedules — but they were even more productive when no estimate was made at all.

The authors also report the results of their Coding War Games, which tested 600 developers from 92 companies between 1984 and 1986. Each employee was measured on designing, coding and testing a medium-size program.

The pleasantness of office work environment correlated to performance: Those developers scoring in the top quarter were 30% to 50% more likely to say their work spaces were acceptably quiet,

private and spacious, compared with those in the bottom quarter.

One study does not prove that working conditions create better performers. An alternative explanation might be that top performers choose to work in better conditions. Either way, the authors point out, an employer gets better performers by providing better work conditions.

Who are the better performers in your organization? You do not have the foggiest idea, DeMarco and Lister maintain. This entertaining book shows how to advance beyond a gut-feeling approach to productivity.

Softcover, \$24.50, 188 pages, ISBN 0-932633-05-6, by Dorset House Publishing Co., New York, N.Y.

GEORGE HARRAR

BOOKS IN BRIEF

VM and Departmental Computing

By Gary McClain

How to install, maintain and use IBM's VM, a topic even more important to IBM shops since the introduction of the company's 9370 mid-range computers.

Softcover, \$24.95, 253 pages, ISBN 0-07-044939-2, by McGraw-Hill Book Co., New York, N.Y.

Hypercard Power

By Carol Kaehler

A member of the Apple Computer, Inc. Hypercard development team leads novice users into the world of this free-form data base organizer.

Softcover, \$17.95, 435 pages, ISBN 0-201-06701-3, by Addison-Wesley Publishing Co., Reading, Mass.

OS/2

By Jeffrey Krantz, Ann Mizell
and Robert Williams

Three IBM software engineers closely involved with OS/2's development present the operating system's features, functions and applications.

Softcover, \$24.95, 282 pages, ISBN 0-471-60709-6, by John Wiley & Sons, Inc., New York, N.Y.

The Expert Executive

By David Hertz

This jargon-free text could spur lagging interest in artificial intelligence tools by directing advice to nontechnical executives — the ones who could be using AI to make planning, production, marketing and distribution decisions.

Hardcover, \$19.95, 238 pages, ISBN 0-471-89677-2, by John Wiley & Sons, Inc., New York, N.Y.

Standards for Open Systems

Interconnection

By Keith Knightson,

Terry Knowles and John Larmouth

Open Systems Interconnect is explained for those who may want to use or implement this model from the International Standards Organization.

Hardcover, \$39.95, 388 pages, ISBN 0-07-035119-8, by McGraw-Hill Book Co., New York.

Publishers wishing to have their books considered for review can direct books, prepublication galleys, press releases, catalogs or other information to George Harrar, Features Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

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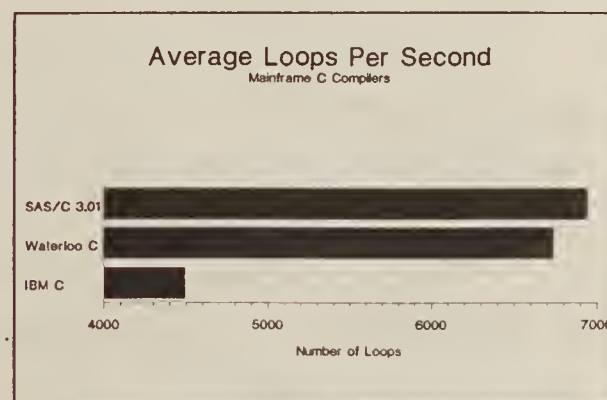
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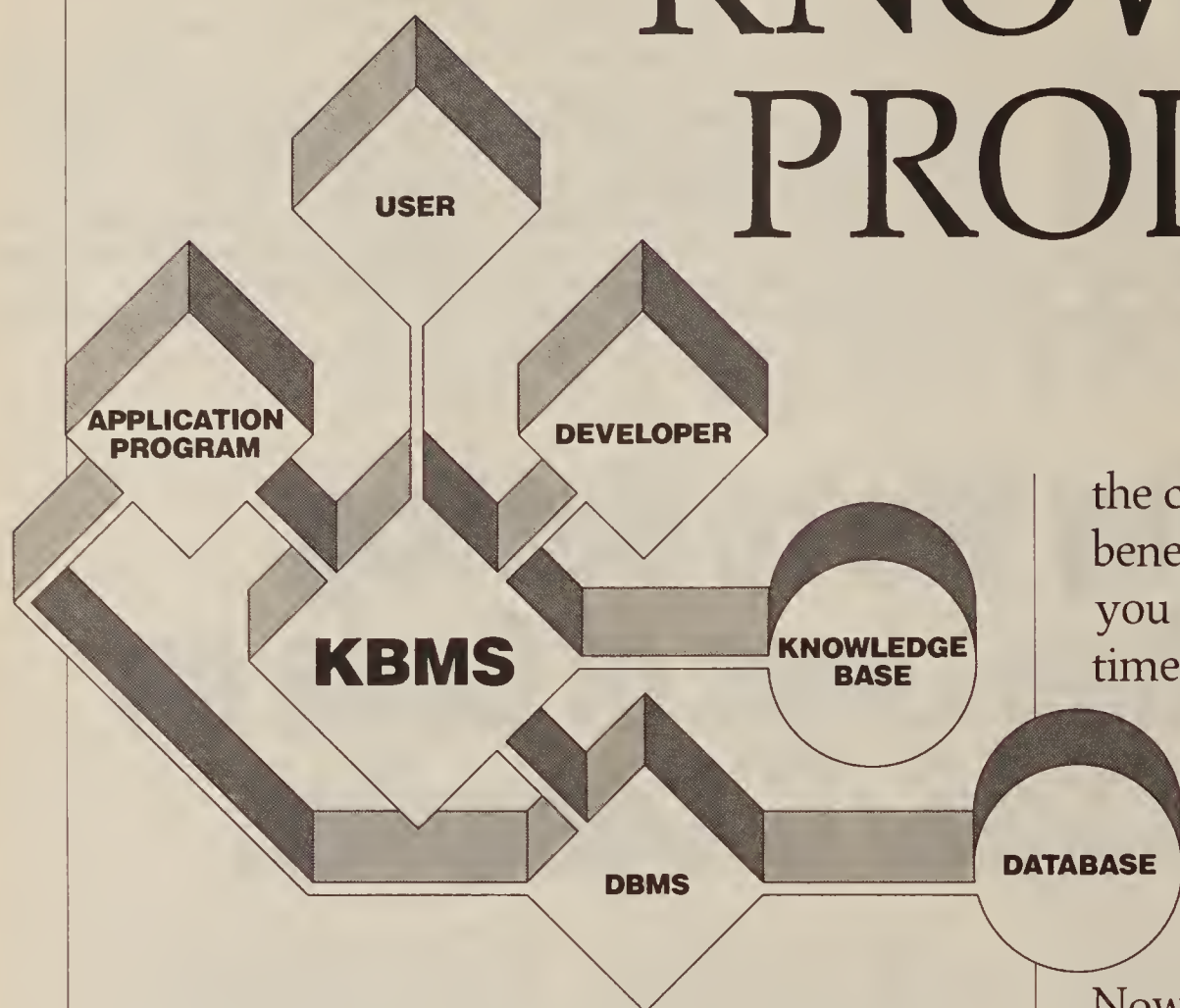
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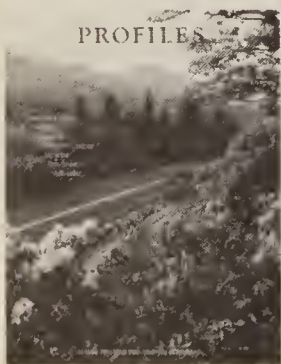
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S O F T T A L K

Charles Babcock

Catching up to IBM's ESA



IBM's announcement of the ESA/370 operating system aroused fear in some quarters that it was a door slamming shut on IBM plug-compatible manufacturers (PCM).

That is always a possibility, and there is little doubt IBM will exploit features of the operating system more quickly than other manufacturers, such as NAS or Amdahl. But the MIS director of a mixed-vendor shop says this is merely the latest event in an old game of leap-frog.

As the head of computing at a large federal agency, he decided to keep his comments off the record. But he expressed keen interest in the ESA/370 announcement because he is one of the few users who has implemented an application that consumes 2G bytes of virtual memory, the limit under MVS/XA.

With the new operating system, IBM is making an additional 16 terabytes of virtual memory available for data. To a federal agency that uses data and moves materials throughout a large percentage of the U.S. population, the expansion of vir-

Continued on page 32

9370s play mainframe, not departmental, role

BY ROSEMARY HAMILTON
CW STAFF

Contrary to expectations, the typical IBM 9370 is running host applications that have long been the mainstay of its bigger brothers in the IBM 370 family instead of distributed or departmental applications, according to a recent survey by Focus Research Systems, Inc.

The survey of 109 user sites that either have a 9370 or plan to buy one indicates that users are assigning traditional mainframe applications, such as general-ledger packages, to this low-end mainframe instead of office support systems or other departmental applications. Of the group surveyed, 85% said their 9370 is located in the MIS department and will continue to

function in a centrally supervised MIS role.

The findings come from a preliminary release of the Focus Research report on the 9370. A complete report will be presented later this month at the ADAPSO Management Conference in Palm Desert, Calif.

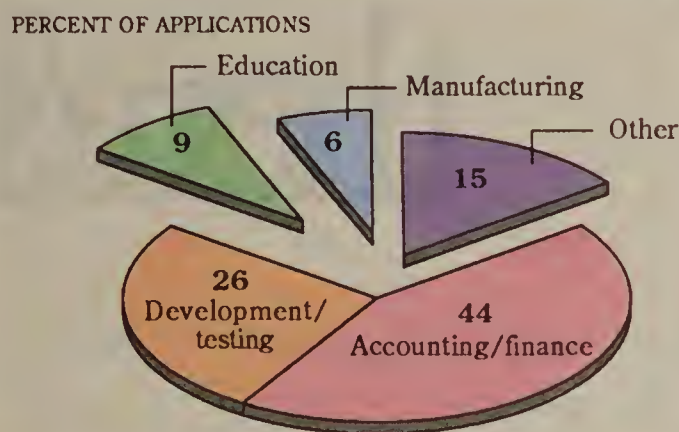
Nearly half of the user sites surveyed reported that their 9370 is either running or will be running accounting or financial applications. These applications include general-ledger, accounts receivable, accounts payable and fixed assets, which are traditional 370 applications.

"Financial applications are the oldest MIS applications. It looks like people are off-loading those to the 9370," said James Russo, vice-president of market-

Continued on page 31

Applications used on the 9370

IBM's low-end mainframe is being used primarily for host-type applications under MIS rather than distributed applications



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.

Analysis fray widens

MIT forecasting program goes commercial

BY ALAN ALPER
CW STAFF

WELLESLEY, Mass. — If Intex Solutions, Inc. is right, a 20-year-old economic forecasting, modeling and data analysis program that is used primarily in academic and government institutions could become a bread-and-butter statistical tool in the commercial world.

Intex, a 3-year-old firm best known for developing add-on products for Lotus Development Corp.'s 1-2-3, recently acquired exclusive marketing rights to the program — which is called Troll, for Time-Shared Reactive

Library. It enables users to model, extrapolate, store data and generate reports within a single mainframe environment. Developed at MIT to facilitate economic research, Troll runs on IBM 370s and compatible mainframes and is aimed at users who need to create econometric models and execute simultaneous equations using vast amounts of data.

Over its 20-year lifetime, Troll has been continually updated, according to Libby Flanagan, product marketing manager. In response to commercial needs, the company recently released

Continued on page 31

HP launches IBM 5080 emulator

BY NELL MARGOLIS
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. recently announced the 5080 Emulator, which it said will let users of HP 9000 workstation graphics access designs and data from mainframe-based applications such as Lockheed Corp.'s Cadam, IBM's Caeds and French manufacturer Dussault Systems' Catia.

All three are popular applications within the aerospace and automotive industries, accord-

ing to Richard Maroncelli, 5080 Emulator product manager at HP.

"We really feel that computer graphics makes more sense on a workstation than on a time-shared mainframe," said a design engineer at a large West Coast aerospace company that is beta-testing the 5080 Emulator. The user requested anonymity.

"The new graphics engines [in workstations] give you the ability to display a vast amount of vectors and pixels locally, which

Continued on page 32

Inside

- Data Processing Services revamps fixed-asset package for System/38. Page 30.
- Tektronix adds plotting tools for VAX. Page 36.

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Cobol monitor eases code maintenance

BY ALAN ALPER
CW STAFF

NEW YORK — Two data processing shops using a Cobol performance monitor developed by a small company here are finding that tested programs are meeting established standards, enabling programmers to more easily maintain code.

Developed by Clarity Concept Systems, Enforcer I automates the process of evaluating adherence to predefined Cobol programming standards. The monitor rates a program's source code understandability and functional complexity, according to Jerry Sitner, Clarity's president.

"It will point out things such as 'move record' vs. 'move employee record,' making sure there are two words in the data name. Or look for uncalled for abbreviations," Sitner explained.

Modifications

Enforcer I is executed alongside the source code of the program being evaluated. A report is then generated indicating the nature and location of each line of code that deviates from predetermined standards. Users can modify Enforcer I to add to or delete standards offered with the monitor. "If they adhere to Cobol 85, for example, you can tell Enforcer I to not allow GOTO statements," Sitner said.

Enforcer I requires 300K bytes of main memory, runs under IBM's OS or DOS systems and resides in the system's load library. It carries a permanent license fee of \$9,500, Sitner said.

Maintenance can account for anywhere between 50% and 80% of a DP shop's development budget, according to International Data Corp., a Framingham, Mass., research firm.

Southern Connecticut Gas Co. has used Enforcer I since last fall on Cobol programs written for its IBM-compatible

mainframe from NEC Corp., which runs DOS/VSE. The company has modified the monitor with a number of user exits to meet in-house Cobol programming standards, according to Jim Ballas, manager of software and programming.

Although unable to quantify time or cost savings, Enforcer I has replaced the salary of one full-time librarian, Ballas said. "Without it, I would have to manually check every line of code," he noted. "I don't have time to do that."

The staff of eight programmers at the Bridgeport, Conn., gas firm was initially unenthusiastic but has been won over,

Ballas said.

"Now, we have truly structured programs," he said. "They're a hell of a lot easier to maintain."

Because of resource constraints, the firm is not testing programs written previous to Enforcer I's installation. "If it's working, I don't touch it," Ballas noted.

Polychrome Corp., a Yonkers, N.Y., graphics plate manufacturer, has made extensive use of Enforcer I for the last two years, according to Jarl Ingers, financial and sales systems manager. "I've looked at other products that are out there, and none handle data dictionary ac-

tivities like Enforcer," he said.

Enforcer I has helped the firm, which has converted from a Unisys Corp. to an IBM mainframe, develop Cobol programming standards. "Not only has the product enabled us to enforce standards, but we have used it as an educational tool. Programmers write better programs," Ingers said.

Because the code is clearer, it is easier to maintain, he noted. Polychrome asked Clarity to develop a hierarchy chart for Enforcer I so programmers can more easily follow the changes that need to be made. "I would say the product has enabled us to cut by 50% the amount of maintenance, as long as there is a different programmer making the changes," Ingers said.

Package for IBM minis tweaked

INDIANAPOLIS — Data Processing Services, Inc. recently released an upgraded version of its fixed-asset package for the IBM System/38 that it said includes improved interactive and on-line capabilities.

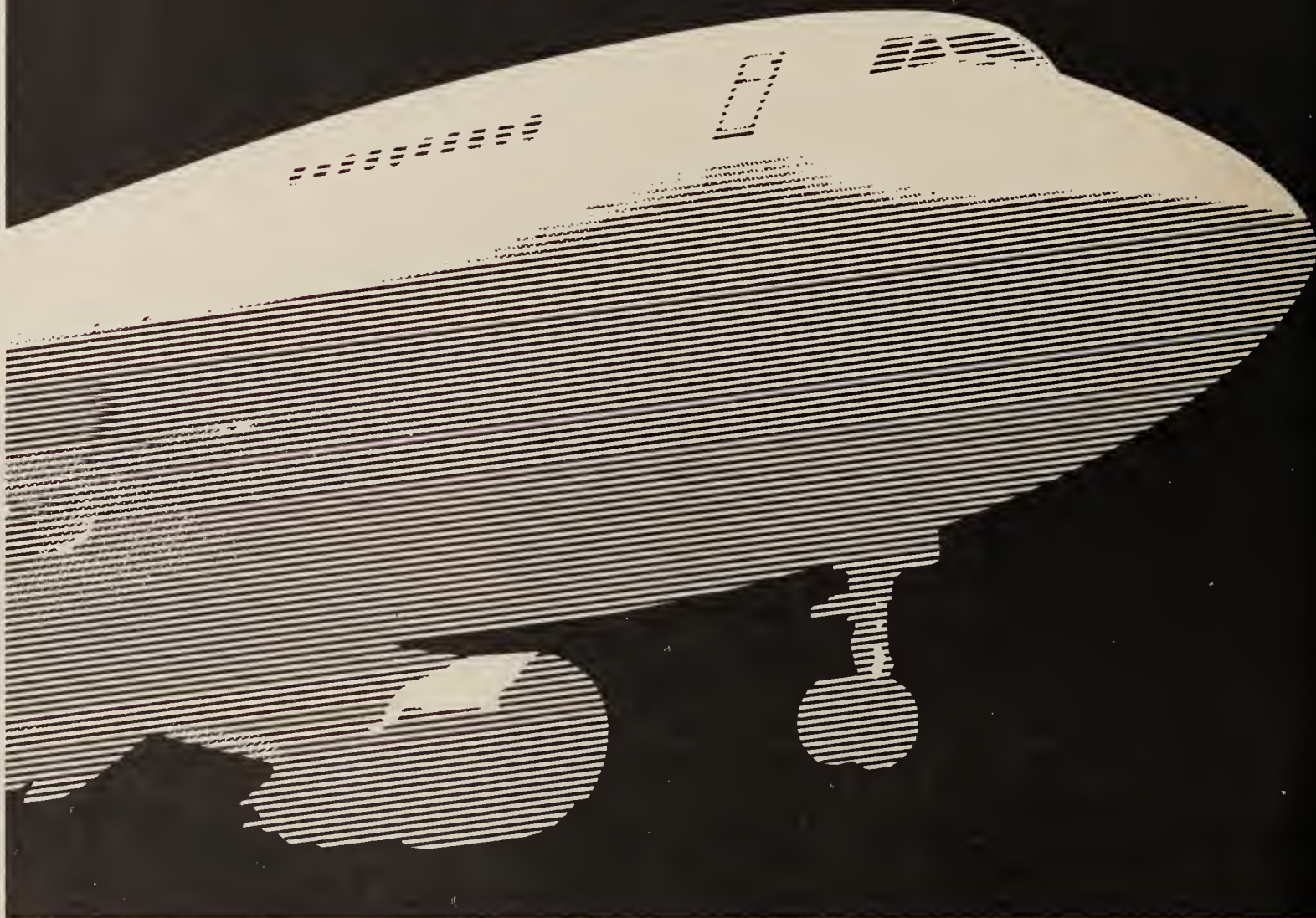
Release 4.0 of the Fin/38 Fixed Asset Management System has also been revised to comply with the latest U.S. tax regulations, including the 1986 Tax Reform Act, the company said.

The software's query capabilities were changed to allow users to directly query certain files or Fin/38 programs, such as the asset-class file and fixed-asset-methods file.

On-line features were added that enable users to perform queries while within certain Fin/38 programs, such as projected depreciation and the asset master file. Previously, a user had to exit a program, go back to the main menu and then perform a query, the company said.

Release 4.0, which is available now, carries a \$6,000 license fee. Users of Release 3.0 can upgrade free of charge, the company said.

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Analysis

CONTINUED FROM PAGE 27

an interface to import data from IBM SQL/DS relational data bases into Troll and a facility to enable Troll-generated graphs to be printed out using some 1-2-3-compatible files.

Troll faces an uphill battle in the commercial world. Entrenched companies such as SAS Institute, Inc. and SSPS, Inc. already offer a variety of economic analysis and modeling packages for micros and mainframes. Flanagan said her product offers a set of forecasting tools within a single mainframe environment.

"With micro-based products, you can download your life away," Flanagan said.

Troll also has a low initial cost with a high monthly subscription fee. An initial license is priced at \$2,000, followed by a \$500 per month fee, Intex spokesmen said.

On a roll with Troll

Stephen Symansky, an economist at the International Monetary Fund (IMF), is an enthusiastic Troll user. He has converted both the IMF, which is constructing an econometric model of the world's economy, and the World Bank to Troll usage. "I've looked at 15 mainframe and PC packages, and Troll is light-years ahead of them," he noted. "It's the only product out there that does rational expectation models."

Rational expectation models are a new

feature added to Troll through a joint project funded by the Federal Reserve Board. Called the Forward Looking Simulator, the module estimates future solutions from a model based on what economic decision makers are likely to do, rather than being limited to historical data, spokesmen said.

The IMF uses an IBM 3081 attached to a 9370 running under the VM operating system. The institution has written some VM programs that enable economists to move data from its homegrown data base on the mainframe into Troll on the 9370 for analysis and modeling.

David Williams, a senior economist in the governor's office in Florida, is using Troll for a variety of forecasts, including state revenues, economic growth, popula-

tion trends, criminal justice requirements and social service needs. Troll is running on an IBM 3084 under MVS.

"There isn't a routine invented over the last 10 years in statistical and econometric techniques that it can't do," he said.

Both Williams and Symansky cited Troll's ease of use for nonprogrammers as a major plus and its lack of quality graphics — despite the bridge to the micro-based packages — as a weakness. "We reenter our data into a Macintosh when we want quality graphics," Williams said.

Graphics weaknesses aside, Intex's ambition to take Troll mainstream could also suffer from its current lack of portability. A long-rumored version for Digital Equipment Corp.'s VAX could go a long way toward expanding Troll's potential user base, observers said.

Intex has hired some of the MIT academics who worked on Troll to help with marketing and development, Flanagan said. Intex hopes to expand its base of 90 sites in 17 countries beyond academic and government users to include financial services and industrial concerns.

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9370s

CONTINUED FROM PAGE 27

ing at Focus.

Another 26% of those surveyed said their system is being used for testing and development of both commercial and in-house-developed software.

"The primary applications usage shows that it is definitely being used as a host," Russo added. "It's an MIS machine, in many cases a stand-alone host doing typical host applications."

Educational users

The survey also found that 6% of the user sites are using 9370s to run manufacturing software. A 9% showing went to the educational market, but Russo cautioned that this group represents educational institutions running a variety of applications on the 9370, rather than commercial users running educational software applications.

Almost half of the group is either running or intends to run commercial applications.

Russo said no single package emerged as a strong leader in the 9370 market. "It's all over the place."

Focus said another indication of the 9370's host role is the operating systems selected for it. Of the 100-plus respondents, 49% said they are running or will be using the IBM VSE operating system.

Meanwhile, 38% have chosen the VM/IS operating system, which is IBM's user-friendly version of VM. Another 13% of the group use a hodge-podge of operating systems, including IBM's MVS and the Pick Systems Pick operating system, Russo added.

The survey respondents represent a wide variety of businesses. One-quarter are manufacturing companies, and 22% are educational institutions. Software vendors make up 11% of the survey, while government sites account for 7%. Russo said the remaining 35% of the group spans "everything from general business to agricultural to transportation." None in the final group had a large enough showing to be separated from this category, he said.

HP

CONTINUED FROM PAGE 27

is something you really want and need," the user said. "We're talking about millions of bits on the mainframe. You just can't do it in real-time."

Automotive design

With the 5080 Emulator, HP's Maroncelli said, an automotive engineer has the ability to move a familiar application from the mainframe, change a car's design and then ship it back to the mainframe, which is the platform of choice for interfacing with the robotics installation on the factory floor.

Co-developed by HP and San Diego-

based Spectragraphics Corp., the 5080 Emulator includes a design-set channel controller that supports up to 64 simultaneous users and eight local-area network gateways.

The emulator runs on HP 350RX or 350CH workstations, opening up mainframe access to both single and multiple users. In the case of multiple users, Maroncelli said, the software supports up to 16 simultaneous 5080 emulations.

More features coming

Moreover, he added, two enhancements for the new emulator — an IBM 3278 emulation package and a high-speed file-transfer product — will be available when the product ships next quarter. The 3278 emulator lets HP 9000 workstation users

perform data-entry inquiry applications as though on a 3278 terminal. The file-transfer software lets them download mainframe data to the HP 9000 at 50K byte/sec.

The 5080 Emulator, the user said, "lets you use the workstation as a dumb terminal. It gives you a bridge so that you can transition your existing applications from the mainframe to the workstation and off-load the design function, but at the same time, it gives you a safety net that protects your investment in mainframe software. That's why this is a strategic product."

HP said 5080 Emulator prices will range from \$9,629 for a single-user license to \$32,858 for a 16-simultaneous user license.

Babcock

CONTINUED FROM PAGE 27

tual memory into data spaces is a welcome move.

At the same time, the MIS director is rooting for the opposition. In his mixed-vendor shop, a 10,000-terminal network is supported by several IBM 3090s and Amdahl 5880 mainframes.

When IBM offered MVS/XA, or when it makes sudden advances in its hardware, the agency has little choice but to buy from the market leader. "We swing to IBM for two or three years, then back again to the plug-compatible manufacturers" as they catch up, he says.

Will the PCMs be able to catch up to the 3090E running ESA/370?

"They'll be hurt for a little while. Then watch American ingenuity pop to the fore again. They've been doing it since 1975, when Gene Amdahl put out

IBM IS putting its development efforts into the ESA basket.

the first Amdahl machine," the MIS director says. "I'll still play both sides."

The ESA/370 initiative opens several doors to large mainframe-oriented shops, the MIS director says. With its greater use of expanded storage, the new operating system will probably offer huge buffers or "a bigger bucket" for operations within the CPU.

"The intelligence community has been using image processing for years," and that form of data manipulation could find increasing commercial use, given the ability to store and move millions of bytes at a time.

The ability to process images would also open the door to handling objects, or packages of instructions and related data that have to move as a unit in and out of the CPU, he says.

And once handling images or larger units of data becomes commonplace, mainframe shops are likely to go to optical storage to archive documents and other large units of data in their original form, he adds.

A point that has not been widely discussed before is that in its ESA/370 announcement, IBM also stated that "MVS/ESA will be the primary base for future SAA enhancements in MVS."

ESA/370 is also "the primary delivery vehicle for future MVS and Data Facility Product functional enhancements and constraint relief."

Thus there should be little doubt IBM is putting its development efforts into the ESA basket. At the moment, that container looks a great deal like MVS/XA with data-space virtual memory added. Both are still working with the 31-bit address word. Migration from one to the other is the equivalent of moving from "dot to dot," according to Carl J. Conti, vice-president of IBM's Enterprise Systems Unit, as users upgrade from one MVS/XA release to another.

But that could change with the next hardware and software announcement. PCMs had best stay light on their feet and ready to run.

Babcock is *Computerworld's* senior editor, software & services.

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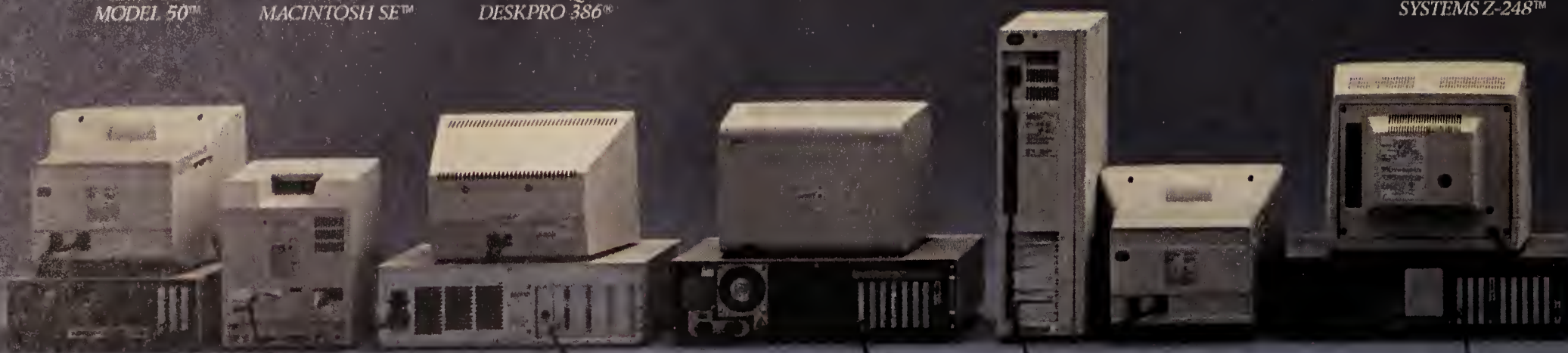
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A real-time operating system designed for use on 16- and 32-bit microprocessors from Intel Corp., Motorola, Inc. and National Semiconductor Corp. has been announced by **Boston Systems Office**.

Called **BSO/Realtime Craft**, the system is made up of three software modules said to provide the processors with real-time multitasking management capabilities. The modules include XEC the executive, IOS the I/O supervisor and FMS the file manager system. Also included are a debugger and a spying function,

which enables the user to examine task states and other objects managed by XEC.

BSO/Realtime Craft costs from \$6,300.

Boston Systems Office, 128 Technology Center, Waltham, Mass. 02254. 617-894-7800.

Release 2.2 of the **TI System V** operating environment for the TI System 1500 has been announced by **Texas Instruments, Inc.**

Release 2.2 features Extended Symmetric Processing (ESP), which lets all processors share equally in scheduling ap-

plications, performing I/O and providing system service functions. It also offers mass storage and terminal interface controllers that run asynchronously to service the application processors.

A Release 2.2 license for up to 32 users costs \$2,995; for more than 32 users, it costs \$4,995. System 1500 users participating in TI's Subscription Update service may obtain the upgrade free of charge.

TI, P.O. Box 181153, DSG-178, Austin, Texas 78718. 800-527-3500.

Applications packages

A series of program modules that provide sales performance statistics and analysis has been introduced by **Stansbury Ltd.**

The **Sales Calculator** allows users to conform, edit, analyze and report sales performance statistics of new account representatives and calling officers. Statistics reported include penetration, cross-sell ratio, deposits and commissions earned. Reports are on a month- and year-to-date basis by all customers, existing and new. Performance ranking and payroll reports are also produced.

The product runs on both microcomputer and mainframe hardware. Microcomputer versions cost \$10,000; mainframe versions cost \$40,000.

Stansbury, Suite D, 7341 Jefferson Highway, Baton Rouge, La. 70806. 504-924-1407.

Languages

Ibuki has announced that its **Ibuki Common LISP** is now available for the Sun Microsystems, Inc. Sun-4/110 and Sun-4/260 workstations.

Ibuki Common LISP is a complete implementation of Common LISP together with a development environment that includes an error handling system, a debugger for symbolic debugging of interpreted and compiled code, an interface to Emacs, a Common LISP interface to X Window systems and a foreign function interface for calling programs written in C and Fortran.

Ibuki Common LISP for any Sun workstation costs \$700.

Ibuki, 1447 Stierlin Road, Mountain View, Calif. 94043. 415-961-4996.

Utilities

An IBM MVS utility called **VSAM Data Compressor** has been introduced by **Softworks, Inc.**

The program is said to cut disk space up to 50%. It has an automatic space release feature that adjusts space if files are inefficiently allocated. It uses no external tables and is fully automatic, according to the vendor. Once installed, it is transparent to the user.

Softworks offers a free direct-access storage device analysis tape that simulates a compression and calculates each data set's percentage of savings from compressions and space release.

VSAM Data Compressor is priced from \$20,000 to \$30,000, depending on CPU.

Softworks, 7700 Old Branch Ave., Clinton, Md. 20735. 301-856-1892.

Tektronix, Inc.'s Computer-Aided Engineering Systems Division has announced three plotting products for Digital Equipment Corp. VAX environments.

The products were designed for Tektronix's Designer's Database Schematic Capture (DDSC) tool.

The **Gmodel Plotter Toolkit** is said to allow users to create a specific plot driver to plot DDSC data base files. Users can then interface most plotters to DDSC.

The **Gmodel Sixel Plotter Interface** lets users to plot DDSC data base files to DEC Sixel Printers.

The **Gmodel Postscript Plotter Interface** allows users to plot DDSC data base files to Adobe Systems, Inc. Postscript devices.

The Sixel and Postscript interfaces cost from \$3,500. The Gmodel Plotter Toolkit costs \$7,500.

Tektronix, P.O. Box 4600, Beaverton, Ore. 97075. 503-629-1152.

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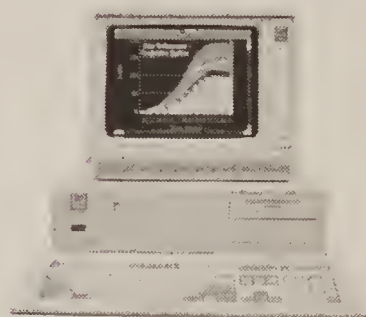
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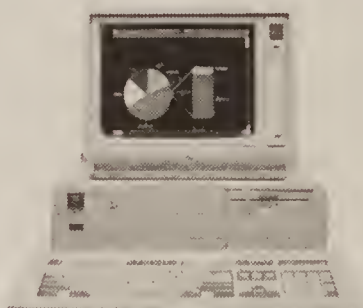
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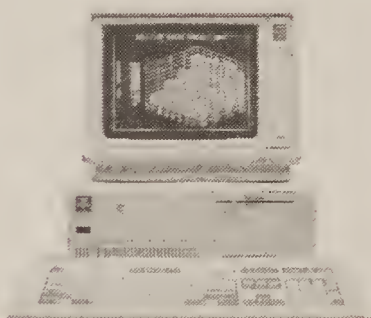
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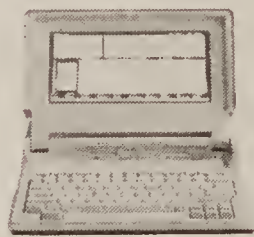
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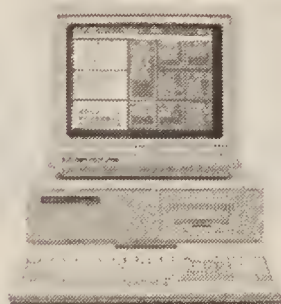
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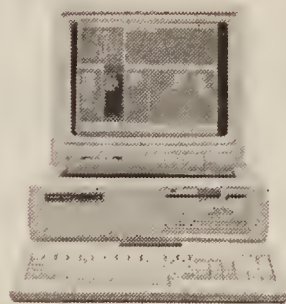
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MICROCOMPUTING

M I C R O B I T S

Ed Scannell

Not everyone likes a clone



To clone or not to clone. At Esther Dyson's recent Personal Computing Forum, Apple's Jean-Louis Gasse

was rather adamant in his position of not licensing Macintosh technology to clone makers. He said encouraging potential cloners would only mean slimmer margins for Apple, thereby cutting down his company's ability to do creative research and development. "What if DEC licensed the VAX? Would they have as much money to put into R&D?" he asked. "We could be giving people the keys to the chicken coop."

At least one major buyer of Macintoshes doesn't think it's necessary to have a Mac clone market. Jeff Ehrlich, General Electric's manager of product technology, buys a couple hundred Macintoshes a month and is a major fan of the system's capabilities and technological elegance. However, for GE to buy a Mac clone, it would have to be priced about 30% below the Mac, something cloners couldn't afford to do given the high up-front development costs, Ehrlich notes.

"Apple's prices are competi-

Continued on page 43

Symantec offers a Grandview

Information outliner said to organize, relate data from varied sources

BY ED SCANNELL
CW STAFF

CUPERTINO, Calif. — Symantec Corp. has jumped into the personal information management market with a product that allows users to organize and track information from various sources.

Grandview, which took two years to develop, has a fully featured outliner and word processor. With its ability to organize and relate any mix of data, the program is intended to complement users' existing spreadsheets and data bases.

Grandview's two main functions are outlining and word processing, for productive work, and category viewing, for finding

relationships in data and tracking work in progress. The program's "viewing" capability lets users look at data in any fashion, Symantec said.

The program's Outline View provides a seamless interface between documents and headlines by letting users open up to nine windows simultaneously and look at a number of headline labels on screen, according to Symantec.

Grandview's Document View offers style sheets, paragraph formatting and custom headline labeling. The program also gives users control over the look of the outline, including headers, footers and table of contents.

Category View allows users to assign outline and word pro-

cessing data to various categories to be tracked throughout a project. The information can then be viewed by project, person, date or several other categories. Symantec claimed no other currently available product has this capability.

Grandview is scheduled to be shipped at the end of this month at a suggested retail price of \$295.

Answers Q&A demand

Symantec also released Version 3.0 of its popular Q&A product last week that integrates word processing and data base functions. The company said it has incorporated more than 100 new features into Version 3.0.

Chief among the new capabilities are record locking, multiuser local-area network support, multiple file support and several major enhancements to the program's word processing and mail merge abilities. The program's multiple file lookup allows it to pull information from multiple Q&A data bases, increasing the number of applications for which the program can be used, a spokesman said.

Version 3.0's record-locking support allows multiple users to simultaneously access the same data base. The program fully supports network access, allowing password protection to be incorporated, which precludes unauthorized entry into data bases, a spokesman said. Q&A Version 3.0 is available immediately and costs \$349. Users of Version 2.0 can upgrade for no extra charge.

Televideo withdraws market bid

BY JULIE PITTA
CW STAFF

SUNNYVALE, Calif. — Televideo Systems, Inc. recently backed out of the engineering workstation market less than one year after entering it.

The company's engineering workstation efforts are "on hold" indefinitely, according to William Crouch, Televideo's senior marketing vice-president. In July, Televideo introduced a line of Intel Corp. 80386-based engineering workstations running the Unix operating system.

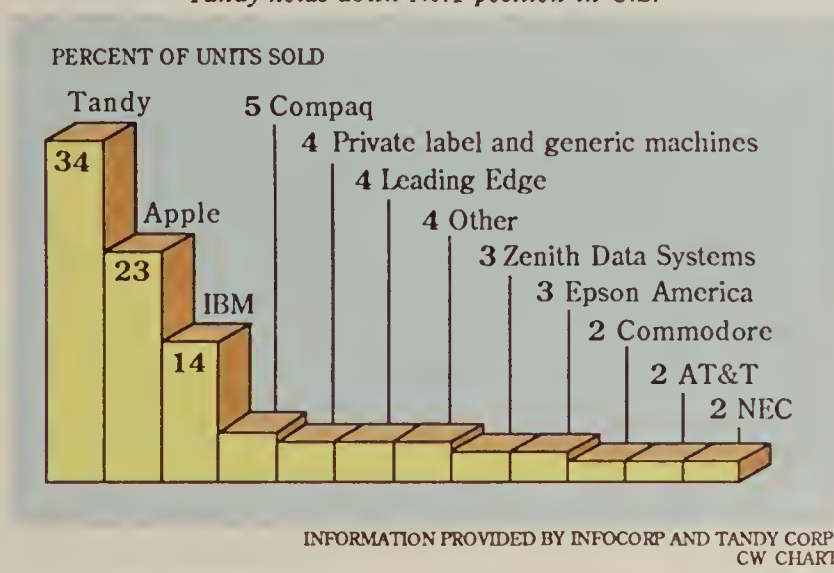
Crouch said Televideo entered the market "a little too soon." The workstations supported X Window Version 10.4, and Televideo said it intended to support Window X.11.

Few scientific applications exist for X.11, Crouch maintained. "There are a lot of people shipping Unix systems into multiuser environments," he explained. "But that's different

Continued on page 42

Data View

PCs' retail market shares
Tandy holds down No. 1 position in U.S.



Inside

- Esber explains Dbase IV, Ashton-Tate's new aggressiveness. Page 41.
- Gupta makes friends with SQLbase. Page 41.
- Datacopy releases Mac OCR for text scanning, graphics capture. Page 50.

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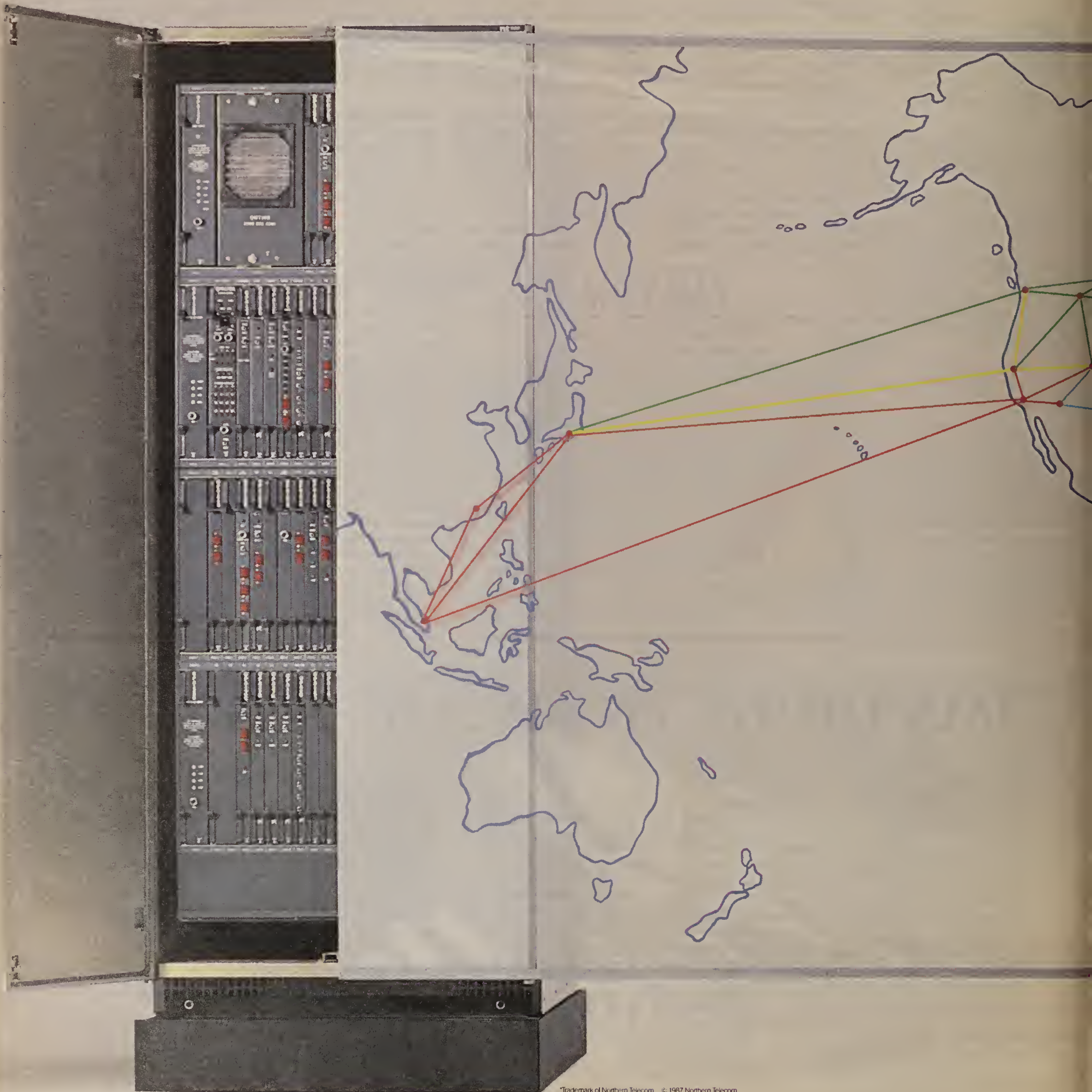
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S M A L L
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Jeffrey Tarter

Info tools
show promise

At Comdex/Fall, a group of relatively obscure "information manager" programs suddenly become one of the hottest stories in town. Industry analysts and conference panelists were almost unanimous in predicting steep growth rates for the new category, and the crowds of curiosity-seekers at the Lotus booth — at which Lotus's Agenda information manager was unveiled — seemed to suggest that the bandwagon was beginning to roll.

Since then, the ballyhoo has died down considerably. Most of the new information managers, including Agenda, are still in the vaporware stage, and the few titles that have actually shipped are generating only a trickle of sales. A fair number of people are beginning to wonder if this new category will ever amount to much. "Why do I need to computerize my Rolodex?" a senior analyst at The Yankee Group asked a large users group meeting recently. Nobody had an answer.

Of course, most genuine software innovations have gotten off to a similarly rocky start. When Bob Frankston, co-developer of Visicalc, offered a public showing of his "electronic spreadsheet" at NCC in 1980, less than two dozen people showed up. When Visicalc appeared, I was working as an editor at a national business magazine. I turned down a Visicalc exclusive because I was convinced that the program had no relevance to managers.

Continued on page 42

No more Mister Nice Guy; Esber says gloves
are off as Ashton-Tate regains fighting trim

In the last six weeks, Ashton-Tate Corp. has grabbed the personal computer industry by the collar, forcing skeptics to take a second look at the Torrance, Calif.-based software firm. With the announcement of some potentially hot applications for Apple Computer, Inc.'s Macintosh and the long-awaited unveiling of Dbase IV, Ashton-Tate is ready to live down two years of criticism.

IN
PERSON

Ashton-Tate's Esber ready for Rocky-like comeback

But a Rocky-like comeback for the one-time king of the data base market will not be easy. An absence of product upgrades has eroded Ashton-Tate's share of the PC data base market, and the firm faces a crushing wave of new competitors in the emerging PC relational data base business. Ed Esber, chairman and chief executive at Ashton-Tate, spoke with *Computerworld* West Coast correspondent Stephen Jones about the company's new aggressiveness, its controversial deal with Microsoft Corp.

Ashton-Tate made an uncharacteristically early announcement with Dbase IV. Have your competitors forced you into the vapor wars?

There are three reasons Dbase

IV was announced early: one, major corporate buying cycles are longer, and as advance information began to get out, it was important for Ashton-Tate to show its product to developers, customers and third-party add-in developers; two, with advanced news out, it was possible that the customers would pause in their purchase of products unless we let them know what to expect; and three, IBM was beginning a

13-city tour during which several software firms were given access to IBM's customers, and one of the prices of admission was a product running OS/2.

I still prefer to announce and ship at the same time, and we will do that whenever possible.

At the Dbase IV announce-

ment, Ashton-Tate took a few swipes at its competitors. Will you be taking a bolder stance with competitors?

Ashton-Tate clearly tried to be a gentleman competitor in the past, maintaining a strong sense of professionalism.

Today, we're down to fighting weight, we're bringing out leadership products, and we won't allow ourselves to do less than the best.

What affect will Dbase IV have on the Dbase clones?

If we continue to move technology, we will be able to maintain a strong share of the market. We do intend to be very protective of the technology in Dbase IV, more so than we have been of earlier versions of Dbase.

We're going to take a more vigilant approach, but instead of doing a Clint Eastwood, we're saying, "Let the cloner beware."

Continued on page 46

Gupta's SQLbase makes
friends, influences users

BY JULIE PITTA
CW STAFF

Gupta Technologies, Inc.'s SQLbase is winning friends among once-skeptical corporate users these days with its ability to deliver features currently unavailable in other relational data bases.

Many users were skeptical about the product because its technology was new and they were not familiar with the company. But after seeing it in action, most have been fairly pleased.

"It's fast, it's available and it fits into the kind of environment we want," said Tony Pizi, Merrill Lynch & Co.'s assistant vice-president of personal computer software development. Like others, Pizi said there was some reluctance at Merrill Lynch to go with an unknown.

"We were a little apprehensive; there were only 10 employees when we first started using it a year and a half ago," he explained. "But they were the only game in town. They're more of a name player now than when we started with them, especially

since the Lotus agreement."

The product's technology recently received a boost in credibility with an endorsement by and licensing agreement with Lotus Development Corp.

Richard Finkelstein, senior consultant with Chicago-based Codd and Date Consulting Group, said, "People who need to network data bases and have any concerns about data base integrity must use this product," adding that it is the only SQL-based product of its kind available.

SQLbase allows the server to act as a traffic cop, directing only requested data toward different microcomputers within the network and cutting down on local-area network traffic. Finkelstein said.

Stephen Morse, technical de-

signer for Manufacturers Hanover Corp.'s data base project, said he is mostly satisfied with SQLbase but has encountered some technical difficulties.

Morse said he discovered a conflict between Microsoft Corp.'s Windows 386 and Proteon, Inc.'s Pronet 1344 card, causing garbage to be written on his network's file server. Although the problem was not traced to SQLbase directly, it arose because SQLbase requires IBM's Netbios to function.

Another user, who wished to remain anonymous, said he also experienced some corruption of his data base. However, he appeared patient with the difficulties. "We've had a few problems, nothing that we wouldn't expect with any new product. After all, this is a new technology."

Micro data base servers are here to stay

First in a two-part series.

BY RICHARD FINKELSTEIN
SPECIAL TO CW

ANALYSIS

The concept of data base servers on micros has arrived and may permanently shift the center of gravity in data processing from mainframes to micros.

The timing could not be better. As users store information on micros, they encounter the same data integrity, security and performance problems associat-

ed with mainframes. These problems become especially apparent on local-area networks.

Historically, data base management system vendors have provided automated solutions to these problems, but personal computer vendors have largely ignored them. This is in part due to the perception that PCs are stand-alone systems that are not susceptible to the same problems as mainframes. Nothing could be further from the truth.

LAN file servers were originally introduced as an answer to the problems associated with

data sharing. Architectural constraints prevented DBMS vendors and application programmers from developing stable automatic facilities that would ensure data base integrity and adequate performance. Because of this, networked data bases were — and still are — susceptible to data loss and erratic performance and were therefore unsuitable for implementing mission-critical systems.

Data base server development began about two years ago, when several vendors recog-

Continued on page 46

Top sellers

Software: Feb. 22-26

1	Lotus's 1-2-3
2	Ashton-Tate's Multimate Advantage II
3	Fifth Generation Systems' Fastback
4	Wordperfect Corp.'s Wordperfect
5	Ashton-Tate's Dbase III Plus
6	IBM's Displaywrite 4
7	Crosstalk Communications' Crosstalk XVI
8	IBM's PC-DOS 3.3
9	Microsoft's Word
10	Software Publishing's Harvard Graphics

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CW CHART

Tarter

FROM PAGE 41

Noise level, in short, is never a reliable indicator of the potential importance of a new software concept. The real test is whether the products themselves actually solve important problems for users.

To get a good sense of why

these programs matter, it helps to look at how many different kinds of information exist in a typical office.

If the office is automated, a good deal of information will probably exist in computerized data bases and spreadsheets. But even then, creating cross-linkages among various information bases remains difficult.

Information manager pro-

grams deal with this problem by creating a common file format that can store and cross-reference many different kinds of text, loosely structured records and, sometimes, graphics. Unlike conventional data bases, these programs don't require users to set up rigidly hierarchical structures for data; instead, they let users "view" the contents of an information base in a

variety of ways.

One obvious question about the information manager category is, "Who's got the best product?" It is unlikely that any one product will ever achieve the same kind of market leadership that Lotus's 1-2-3 or Ashton-Tate's Dbase have. Instead, I expect we'll see at least a half-dozen major products, each offering special capabilities op-

timized for specific applications.

It may take a while for the skeptics to kick the tires and look under the hood, but I suspect information management programs will become a major part of the office automation picture.

Tarter is editor and publisher of "Softletter," a Cambridge, Mass.-based newsletter for software developers and publishers.

Televideo

FROM PAGE 37

from the [computer-aided design] market. The CAD market is waiting for X.11. It really wasn't a viable product for us."

Televideo's Telestar workstations were scheduled for shipment last October. However, the line was never shipped in volume. Complicating the company's efforts was a shortage of monitors resulting from a labor strike in South Korea, where Televideo owns a production plant.

Sources close to the company said Televideo, struggling through slumping sales and, at best, marginal profitability, "rushed into [the Unix-based engineering workstation market] and tripped. It turned into a much smaller market than they thought it would be."

Last year, Televideo Chairman and Chief Executive K. Philip Hwang said Unix-based engineering workstations would be an important strategy for troubled Televideo, which in the past has suffered from an unsuccessful foray into the retail and OEM personal computer markets.

Crouch said Televideo remains committed to Microport Systems, Inc., a Unix developer.

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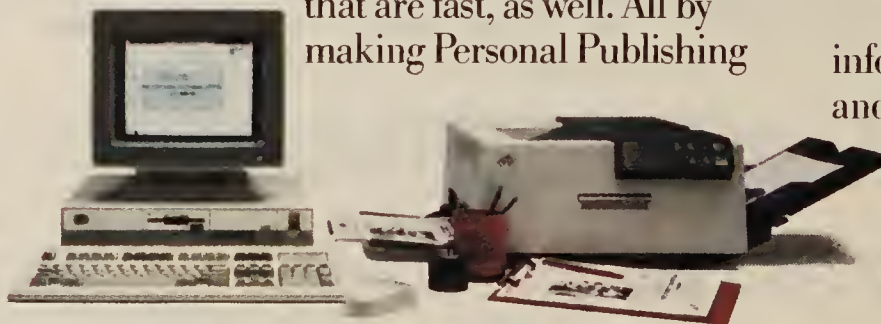
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In every desktop publishing system, information is passed between the CPU and the printer. And for most systems, that's where the publishing process slows down.

Bit &

THE COMPANY NEWSLETTER

All-Stars Clinch Division Title

Heavy hitting powers All-Stars to the top

Last night, the All-Stars won the game, the title and a chance to shuffle off to Buffalo next week for the championships. The All-Stars powered themselves to the top with a 9-5 victory over the Grass Stains, who had been tied with the All-Stars for first place. The game was tight until the bottom of the fourth when the All-Stars blasted into the lead with two home runs to the upper deck in left field.

The game was highlighted by a most improbable play in which three All-Star players, each running at different speeds, ended up on third base at the same time. Fortunately, the third baseman missed the throw from centerfield, allowing two of the runners to score.

"I believe we pulled it off," ex-

L. Pierce Riding Ac

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Scannell

FROM PAGE 37

tive. I'm not going to buy from anyone else for 10% less. The margins aren't there anymore," Ehrlich says.

No more slack. Word has it that IBM and Microsoft have lost most of the slack time built into

the development schedule for the Presentation Manager. This is particularly disturbing for those vendors and users who say a graphical user interface represents the true realization of OS/2.

The problems appear to be primarily bureaucratic and not technical in nature. It seems to be taking longer than expected for one company to sign off on a

particular segment of the program and turn it over to the other.

Actually, IBM's Hursley Group, which is working on the File Manager, is a third party that further slows things down. While it's early yet, it looks like IBM and Microsoft will have to struggle a bit to make the Presentation Manager's October deadline.

Thanks for the loan. An Intel executive told us last week that the stake IBM had in his company was much like "an insurance policy" to ensure Intel could meet demand for IBM's systems.

Once Intel started churning out enough chips to satisfy demand, Big Blue took back its dough. IBM, which once owned

20% of the company, sold its remaining 3.1 million shares of Intel in December.

"We never took the money out of the bank. [IBM's stake] was like an insurance policy," the Intel official said.

However, what goes around comes around, and now Intel is reportedly working on a PS/2 chip set.

The company also said that demand for its 80386 boards are high among its corporate accounts for both office and home use. Apparently, some customers who use 386s in the office aren't accustomed to foot shuffling when they work at home on their personal computers and have become, well, addicted to speed.

Today — 0%. Tomorrow — 1%! Stand back, Jack. Mitac, a Taiwan-based PC manufacturer, just wrapped up its yearly meeting and has resolved to "secure" 1% of the worldwide PC market by the end of this year. To get a 1% share, the company figures it has to sell about 200,000 personal computers. Mitac said it plans to have an IBM Personal System/2 Model 30 compatible out during the second half of this year.

From Russia with love. Apple's Gasee, again speaking on a panel at Esther Dyson's recent forum, came up with a nice little phrase for unfriendly interfaces — KGB interfaces. Such interfaces are those that impede users from accessing information. Gee, I wonder whose interface he's talking about.

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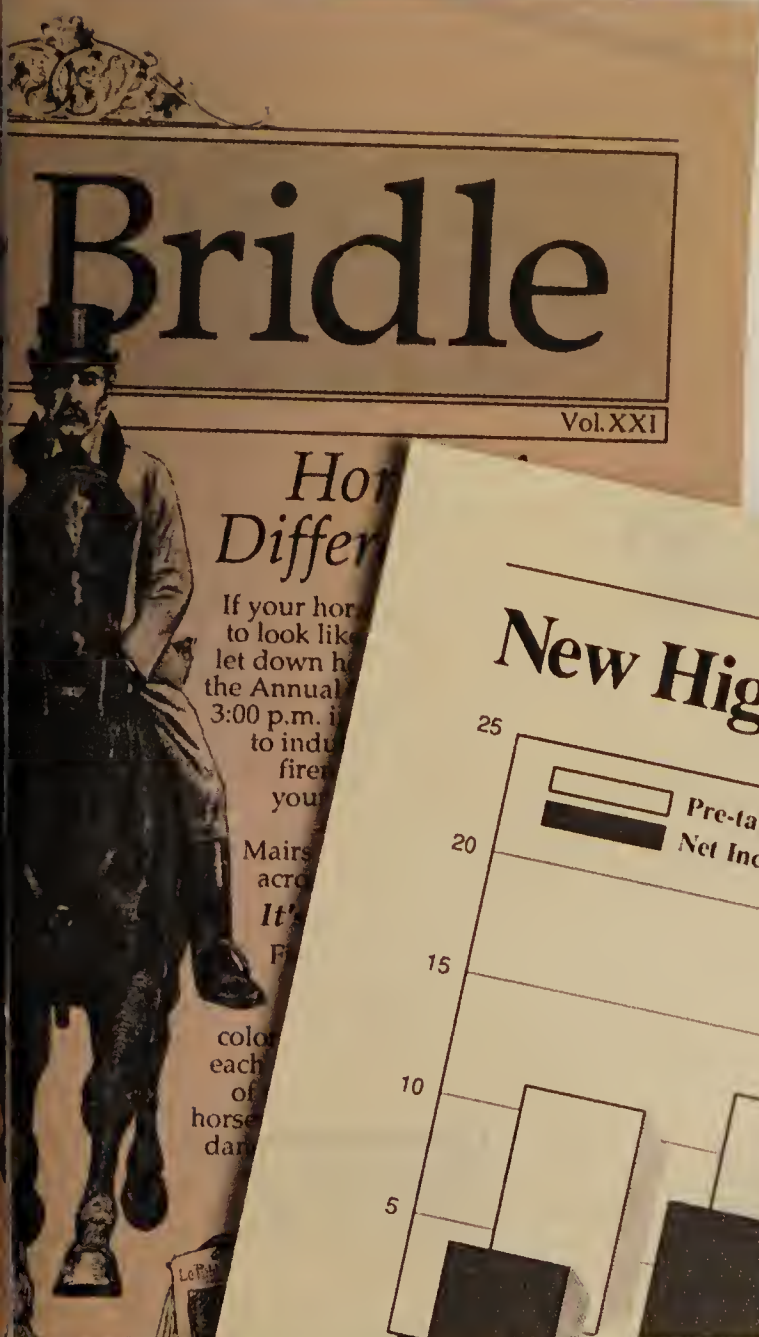
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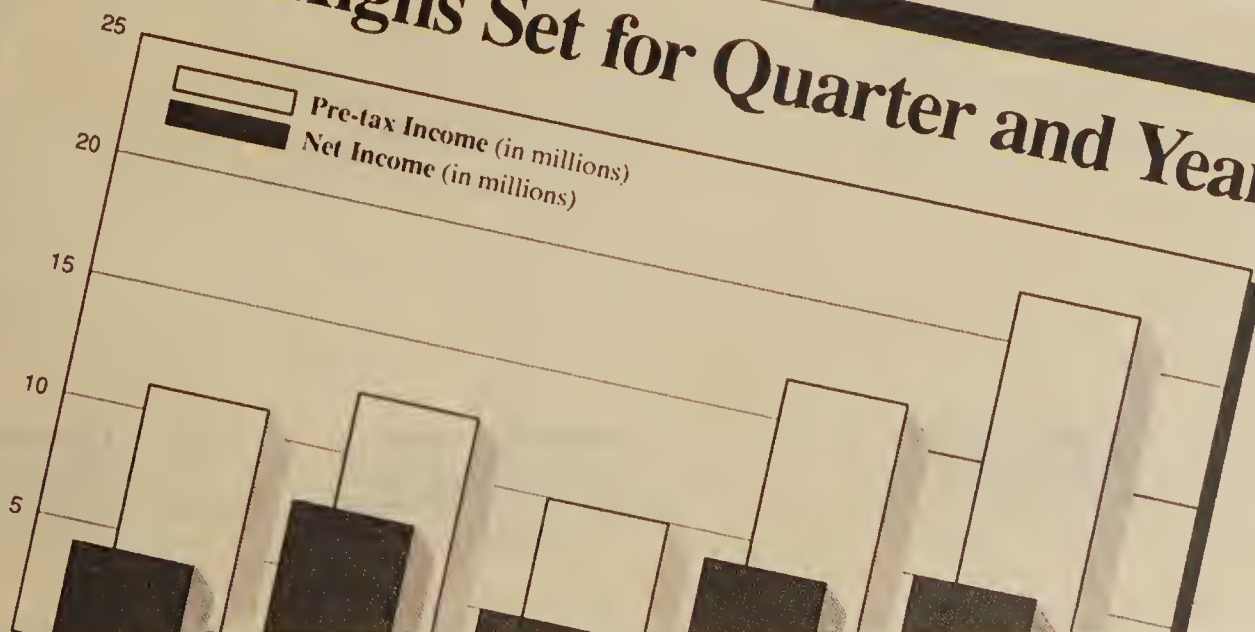


The Bigger Picture

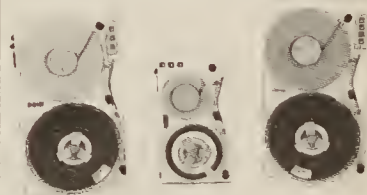
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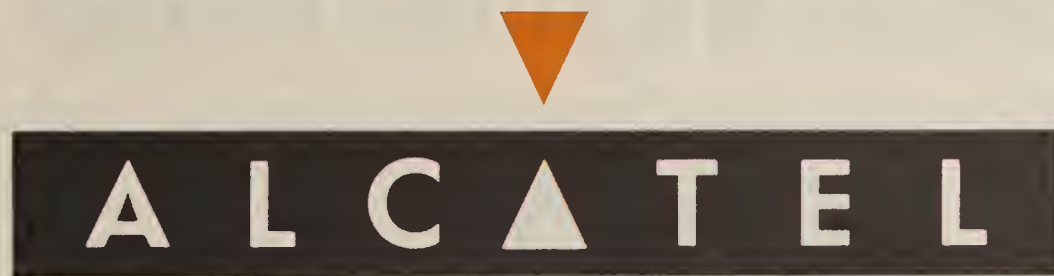
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Esber

FROM PAGE 41

Did you give up competing for a share of the back-end data base market when you opted for SQL Server?

That is a misconception. Dbase IV ships with a back-end engine that is roughly 30% of the code,

and other versions will have back ends that are world-class. For the OS/2 server market, we joined forces with Microsoft to promote the Sybase technology. Nobody has given up anything; what's happened is that three companies have said, Let's confuse people less and support one OS/2 server product.

Do you have a role in how

SQL Server is enhanced?

Both Microsoft and Ashton-Tate had lots to say about what SQL Server will do and how, but clearly, Sybase had the most to say. Both Microsoft and Ashton-Tate will play a substantive role in SQL Server's evolution.

Could Ashton-Tate's Framework or Multimate be positioned as a front

end to SQL Server?

Expect that any release of an Ashton-Tate product that could benefit from the SQL Server technology will be designed to capture that benefit.

Are you concerned that Microsoft might take you on in the data base market?

I am restricted in certain ways in

competing with Microsoft on a server in the OS/2-Intel world. Microsoft has some restrictions on it in competing in the data base workstation market, and those deal with SQL and the Dbase language, among other restrictions. To make this relationship work, it was necessary that we agreed to certain restrictions related to servers and data bases.

Micro servers

FROM PAGE 41

nized the need to bring mainframe stability down to PC LANs. Client/server systems, as they are called, transfer all DBMS functions to a centralized DBMS, or server. Data base servers differ from traditional mainframe DBMSs in that the server is distinctly separated from the front-end (client or requestor) applications.

Users can still run applications such as Lotus Development Corp.'s 1-2-3 at the client workstation but store all information at the server. Multiple users can now access the same spreadsheet information without fear of corrupting or losing data.

Reduce traffic

Data base servers have better performance than traditional file server systems. Data base servers select and transmit only the specific information that is requested. Data base servers also support advanced locking strategies that permit greater concurrency on multiuser LANs.

The recent announcement of the Microsoft Corp./Ashton-Tate Corp./Sybase, Inc. OS/2 SQL Server partnership firmly cements SQL client/server technology into mainstream data base application development. Microsoft's server requires OS/2 but supports both DOS- and OS/2-based workstations. Lotus has announced a competitive product that uses Gupta Technologies, Inc.'s SQLbase technology and has the advantage of being able to run on both DOS and OS/2 platforms.

IBM has also announced a planned enhancement to OS/2 Extended Edition that will include data base server capabilities. IBM's product will require OS/2 on both its server and workstations, but users will benefit from a highly integrated data base architecture. With many other major relational data base vendors developing server products, users can pick and choose the system that best meets performance and application needs.

Next week we will conclude with a discussion of data base server applications.

Finkelstein is a senior consultant for the Codd and Date Consulting Group in Chicago and publishes "SQL Review" newsletter.

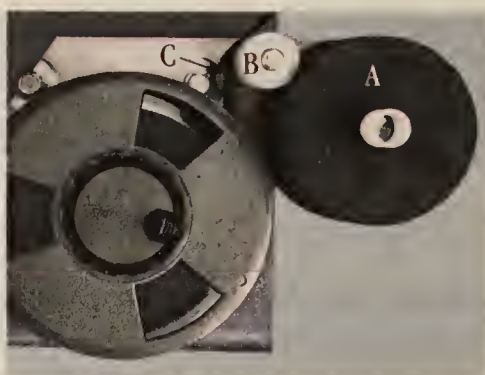


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Beyond NetWare, Novell offers PCOX™ software for linking PCs and LANs with mainframes and minicomputers. And bridging software to connect separate LANs.



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NEW PRODUCTS

Software applications packages

Mac OCR, an Apple Computer, Inc. Macintosh-compatible program for text scanning with graphics capture functions, has been announced by **Datacopy Corp.**

Intended for use with Datacopy's Model 730 and Jetreader scanners, Mac OCR formats text for Apple's Macwrite and Microsoft Corp.'s Word. It stores graphics in more than 10 formats for compatibility with a range of illustration and page-layout software.

Typically, the vendor said, Mac OCR

can read a 2,000-char. text page in less than a minute.

Mac OCR costs \$695.

Datacopy also announced **OCR 4mat**, software that automatically converts scanned data into files that can be read by Lotus Development Corp.'s 1-2-3 on an IBM Personal Computer. It costs \$195.

Datacopy, 1215 Terra Bella Ave., Mountain View, Calif. 94043. 415-965-7900.

An enhanced Unix spreadsheet package featuring a Lotus Development Corp. 1-2-3 work-alike interface has been announced by **Unipress Software, Inc.**

The package, called **Q-Calc Standard**, also features 1-2-3 file compatibility and 94 financial, statistical and mathematical functions. Users can interactively process spreadsheet data through their own custom extensions or Unix utilities.

An optional graphics support package allows users to produce business graphics.

Q-Calc Standard costs from \$450 on personal computers to \$4,000 for superminicomputers.

Unipress Software, 2025 Lincoln Highway, Edison, N.J. 08817. 201-985-8000.

Dmaintenance, a stand-alone equipment maintenance tracking program that runs on IBM Personal Computers and

compatibles, has been announced by **SBT Corp.**

Dmaintenance schedules maintenance, tracks labor and materials, records service contract activity and tracks purchasing and leasing from different vendors. Written in Ashton-Tate Corp.'s Dbase III Plus, Dmaintenance keeps records for up to 99 providers of equipment maintenance. Other features include multilevel security and the ability to enter new records without exiting the current on-screen procedure.

Dmaintenance costs \$395; a multiuser version costs \$595.

SBT, One Harbor Drive, Sausalito, Calif. 94965. 415-331-9900.

A utility for finding, collecting and examining text material in word processing, ASCII and data base files has been introduced by **O'Neill Software.**

The **Text Collector** is said to be capable of searching an entire disk or specific groups of files for a combination of terms. It automatically saves all context blocks meeting the search criteria. Users can also collect material interactively as they browse through files.

The program permits searches using Boolean operators, nested parenthesis and 14 wild cards.

The Text Collector runs on IBM Personal Computers with IBM PC- or Microsoft Corp. MS-DOS 2.0 or above. It costs \$69, plus \$3 for shipping and handling.

O'Neill Software, Box 26111, San Francisco, Calif. 94126. 415-398-2255.

Software utilities

Fill & File, software said to allow users to fill business forms using personal computers and to store information from those forms in data files for later use, has been announced by **Formworx Corp.**

According to the vendor, the user can create an on-screen likeness of the actual form and then fill in the blanks either by using the keyboard or by calling up information from the data files.

The user interface features pull-down menus that allow users to draw solid, bold or dotted lines and to create boxes and blanks to be filled in. Color is supported. The data files are compatible with ASCII and Ashton-Tate Corp.'s Dbase III Plus file formats, the vendor said.

Fill & File costs \$149.

Formworx, Reservoir Place, 1601 Trapelo Road, Waltham, Mass. 02154. 617-890-4499.

A software package that is said to be capable of converting Autodesk, Inc.'s Autocad drawing files into ASCII format files without using Autocad has been announced by **The Great Softwestern Co.**

The software, called **D2D**, runs independently of Autocad. It allows users of third-party applications that read .DXF format files to access Autocad data.

According to the vendor, the product can effectively take a 300K-byte Autocad drawing file in .DWG format and convert it into a .DXF format in less than 30 seconds.

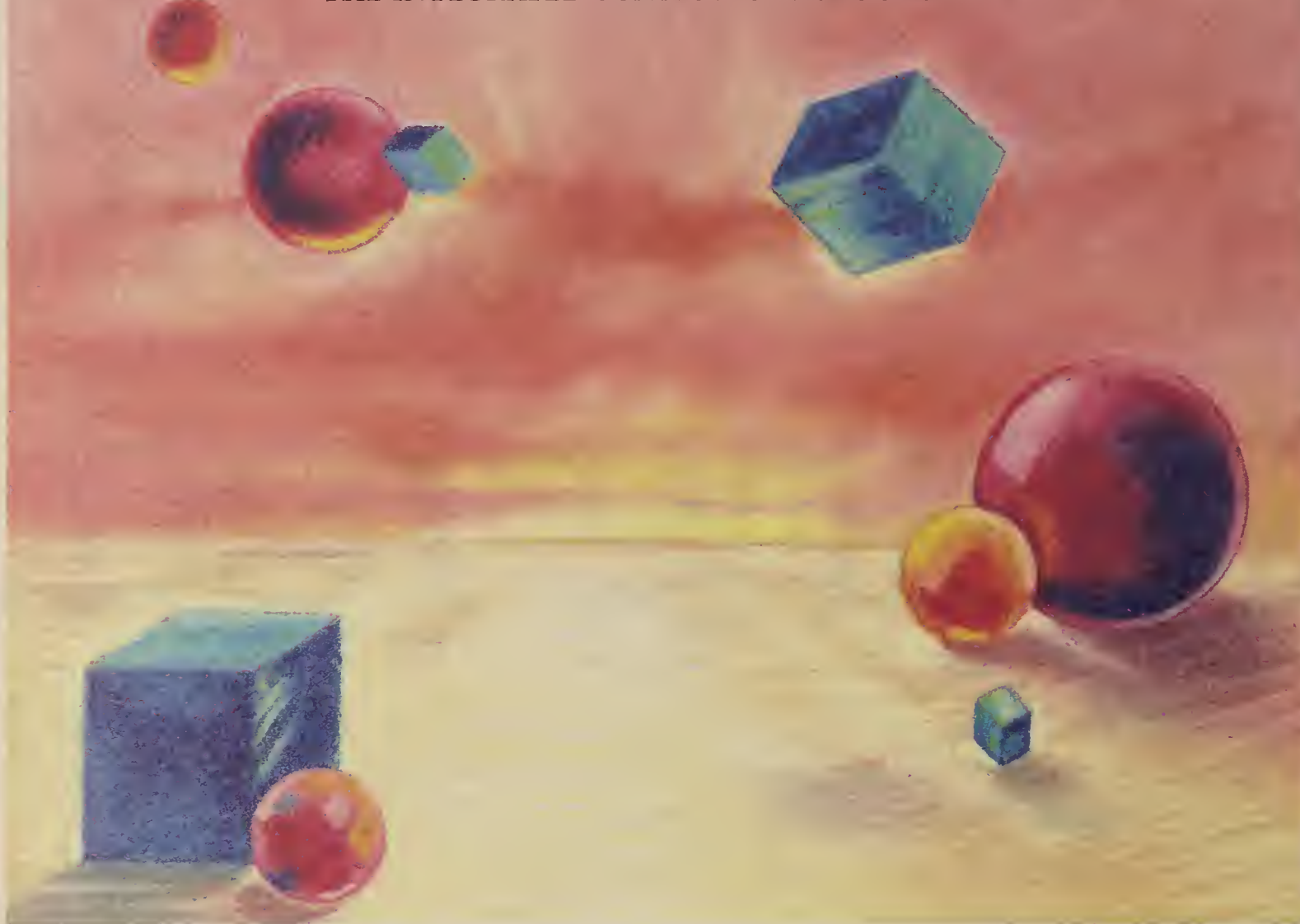
D2D automatically places the correct file extensions and, during the conversion process, can even recover some drawings containing errors.

D2D is priced at \$99.

Great Softwestern, Suite 202, 207 W. Hickory St., Denton, Texas 76201 817-383-4434.

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NETWORKING

DATA STREAM

L. David Passmore

Appletalk: A real LAN?

Although Apple's Macintosh has found increasing acceptance in the business world, there are many who regard Apple's network, Appletalk, to be a joke, something less than a real local-area network.

With Ethernets and IBM Token-Ring LANs running the gamut from 4M, 10M and 80M bit/sec. and with 16M and 100M bit/sec. versions on the way, the 230K bit/sec. Appletalk speed seems slow by comparison. Many user surveys published in the trade press don't even bother to include Appletalk. The network appears to have been developed only as a convenient way to connect Macintoshes to Laserwriters, not as a general-purpose LAN for users to perform real work.

Appearances can be deceiving, however. In a number of ways, Appletalk is more sophisticated than any LAN available for the IBM Personal Computer world, as it supports several advanced features.

For example, an inter-networking capability permits the routing of transmissions among multiple local or modem-linked remote Appletalks. A name-binding protocol automatically and dynamically assigns new network names and addresses to new nodes as soon as they come up on the network. This eliminates the need for any manual network configuration process, contributing substantially to Appletalk's ease of installation.

Continued on page 58

Ma Bell faces rival in Boston

Fidelity, Merrill Lynch propose fiber-optic net to link business hub

BY ELISABETH HORWITT
CW STAFF

BOSTON — Fidelity Communications, Inc. and Merrill Lynch Teleport Technologies, Inc. have announced the formation of Teleport Communications-Boston, a joint venture to build and operate a fiber-optic network in downtown Boston's financial and business districts.

The partners will initially market the network to their respective parent companies, Boston-based Fidelity Investments and Merrill Lynch & Co. But Teleport Communications also plans to offer its fiber facilities as an alternative to New England Telephone Co.'s local telecommunications services.

The service will target regional financial institutions and other companies "that rely heavily on telecommunications

and don't want to put all of their eggs in one basket," said Paul Chisholm, the venture's newly appointed general manager.

The fiber-optic network will be competitively priced and offer "greater security as well as faster, more reliable transmission" compared with traditional copper-based telephone wiring, Chisholm said. He said the venture will be able to draw on technology and expertise of New York Teleport, a similar network in the New York/New Jersey area that Merrill Lynch Teleport Technologies operates.

'Built-in customers'

The venture is likely to succeed because, like New York Teleport, its parent companies are "built-in customers," said Frank Dzubeck, president of Washington, D.C.-based Communications Network Architects, Inc.

Other potential clients include high-technology firms in and around Boston and AT&T, which currently buys fiber-optic capacity from New York Teleport, Dzubeck said.

New England Telephone intends to "compete vigorously" with the new venture, according to a company spokesman. By the end of this year, the local carrier will have 5,300 miles of fiber-optic wiring miles in Massachusetts, with the greater portion concentrated in the Boston area, New England Telephone spokesman Mark Marchand said.

Currently under construction, the Teleport Communications network is scheduled to begin operating by midyear. Tentative future plans include extending the network to Route 128, where a number of high-tech companies reside.

3+ Open to hit shelves in June

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — 3+ Open, the latest release of 3Com Corp.'s network operating system, is said to be on schedule and ready to ship in June.

Microsoft Corp. and 3Com took to the road recently to demonstrate the jointly developed Microsoft OS/2 LAN Manager, which is four months away from shipping to OEMs.

3+ Open is said to provide many of the services now available to users of 3Com's current generation of software, 3+. Specifically, it will provide 3+ Share; Name; 3+ Mail; remote server; remote PC; Net-connect; Start; IBM Systems Network Architecture/3270; 3+ Reach, a programming interface for mail gateways; and Net-DOS.

3+ Open will add a LAN Manager core, protocol independence, performance and security improvements and network management, according to the vendor.

Current 3+ users will be able to upgrade to 3+ Open. 3Com also stressed that it will continue to support 3+ and plans to pro-

Continued on page 58

DataView

Vendor backing for OSI

*IBM stands alone with 802.5 token-ring support;
others stick with 802.3 Ethernet*

Protocol	Data General	DEC	Hewlett-Packard	IBM	Wang
CCITT X.400	A	S	A ²	A ²	I
FTAM	—	I	I	I	I
Virtual Terminal	—	I	I	—	I
OSI ¹ Session	I	S	A	S	I
OSI Transport	I	S	A	S	I
OSI Internet	—	S	I	I	I
IEEE 802.3	S	S	S	—	S
IEEE 802.5	—	—	—	S	I
CCITT X.25	S	S	S	S	S

¹ The ISO's Open Systems Interconnect

² Delivery in Europe only

Key: S = Shipping

A = Announced

I = Statement of intention issued

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Fiber LANs seek market

BY JAMES DALY
CW STAFF

Fiber-optic networks, which have been used primarily as a backbone connecting multiple local-area networks based on other cabling media, may be on the verge of taking the next giant step in their evolution: directly connecting user workstations.

What is the potential catalyst for this development? A growing demand for enough local bandwidth to support application-to-application communications and distributed data processing among powerful workstations

Continued on page 57

Inside

- Hughes Electronics takes pride in global LAN. Page 55.
- FCC price cap meets with resistance. Page 62.
- Amnet adds X.25 concentrator to Nucleus line. Page 66.

Warning: Bargains can be hazardous to your network.

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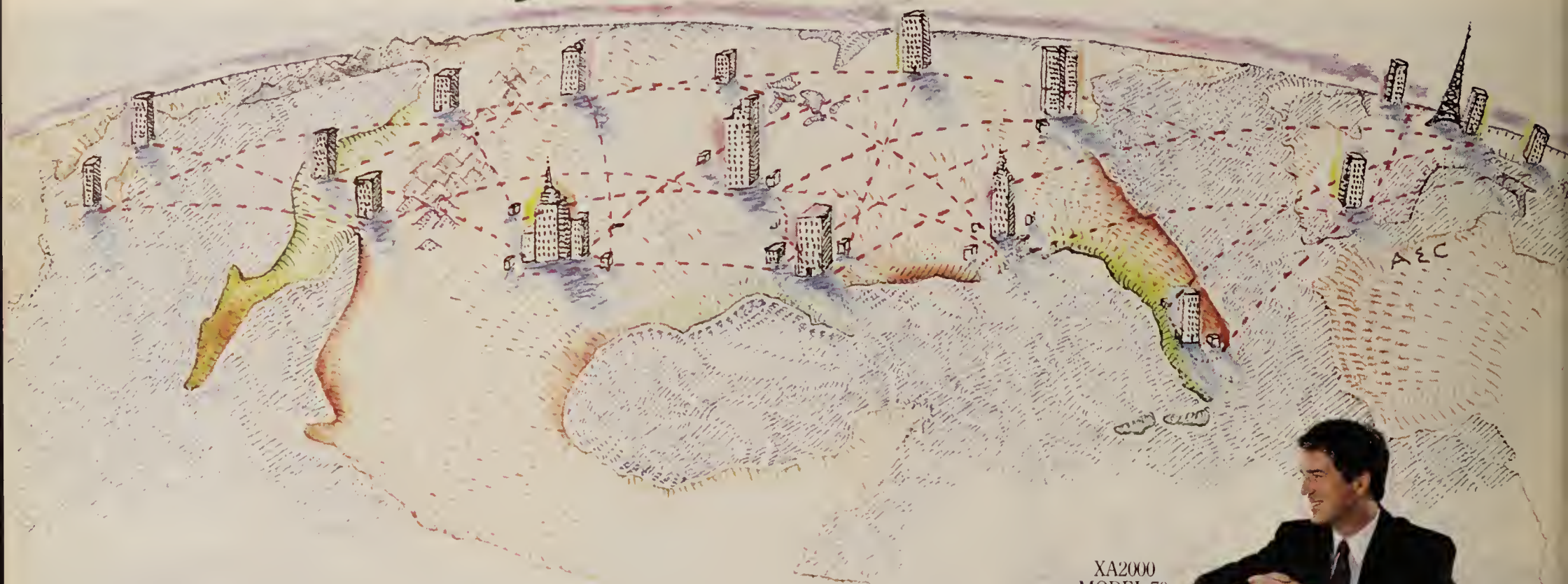


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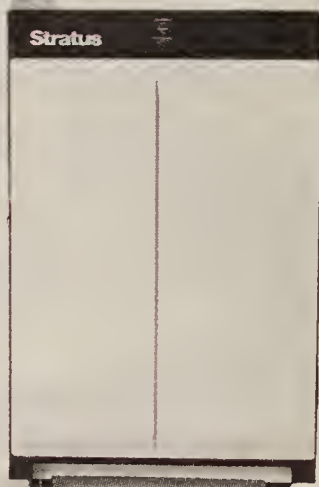
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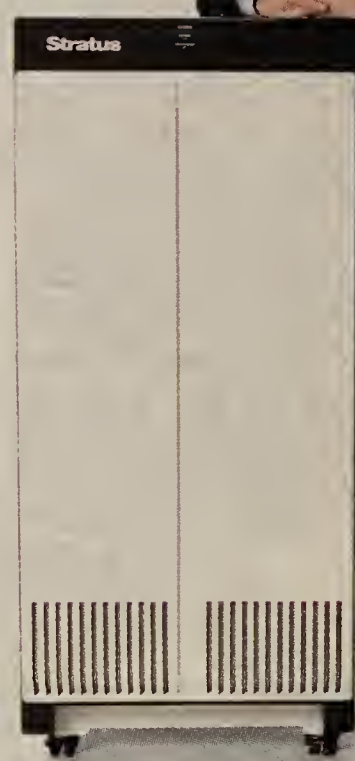
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Hughes bandwidth scheme knows no bounds

BY ELISABETH HORWITT
CW STAFF

LONG BEACH, Calif. — General Motors Corp. subsidiary Hughes Electronics Corp. has taken a lot of trouble — and spent a lot of money on long-distance bandwidth — to ensure that users at various corporate local-area network sites have quick access to resources on other LANs.

Hughes has interconnected individual LAN sites throughout the country over high-speed dedicated lines into what is "probably the largest [multivendor] Ethernet in the world," said Jack Covert, head of the company's technical support services. The network is connected by Digital Equipment Corp. and Vitalink Communications Corp. bridges — devices that take transmissions on one LAN and route them out over a remote connection to resources and workstations on

While routers can make intelligent decisions about how to route a packet directly over multiple network links to the right destination, bridges must often broadcast a packet over all adjoining links until it reaches the right node. Bridges thus tend to use up more long-distance bandwidth, but Hughes was willing to pay for high-speed lines in order to have a "plain vanilla Ethernet," Covert said. "We don't want to deal with individual subnetworks, [each using a different protocol]. It gets too messy."

A few groups of users on 3Com Corp. 3+ networks and Apple Computer, Inc. Appletalk LANs are loosely connected to

the corporate communications system. Covert's people treat these installations as true subnetworks, not as part of the corporate Ethernet system.

Sour on net management systems

While Covert said he is generally happy with his Ethernet bridges, he is less happy about the network management systems that bridge vendors currently offer. One of his major complaints is that he must buy a separate network management system for each new brand of bridge he installs. This is the main reason Hughes' bridge installations are for the most part limited to Vitalink and DEC products — although

one or two groups of users have installed a few Bridge Communications boxes on their own.

Covert said he would like to see network management software monitor error rates and volume of packets sent, "just like what you can do now on an SNA network." He also requested a bridge alarm system "that tells you about systems going down right now" and management reporting software that would allow him to project usage growth and anticipate problems.

"I've had to write my own code to poll Vitalink and DEC machines to figure out what's wrong. What vendors have given us so far is pure garbage — you can't manage an Ethernet now with what they give you," Covert said.

WE'VE GOT a philosophy on how to set up our Ethernet, which is to get as much bandwidth as cheaply as we can to provide for peak periods."

JACK COVERT
HUGHES ELECTRONICS CORP.

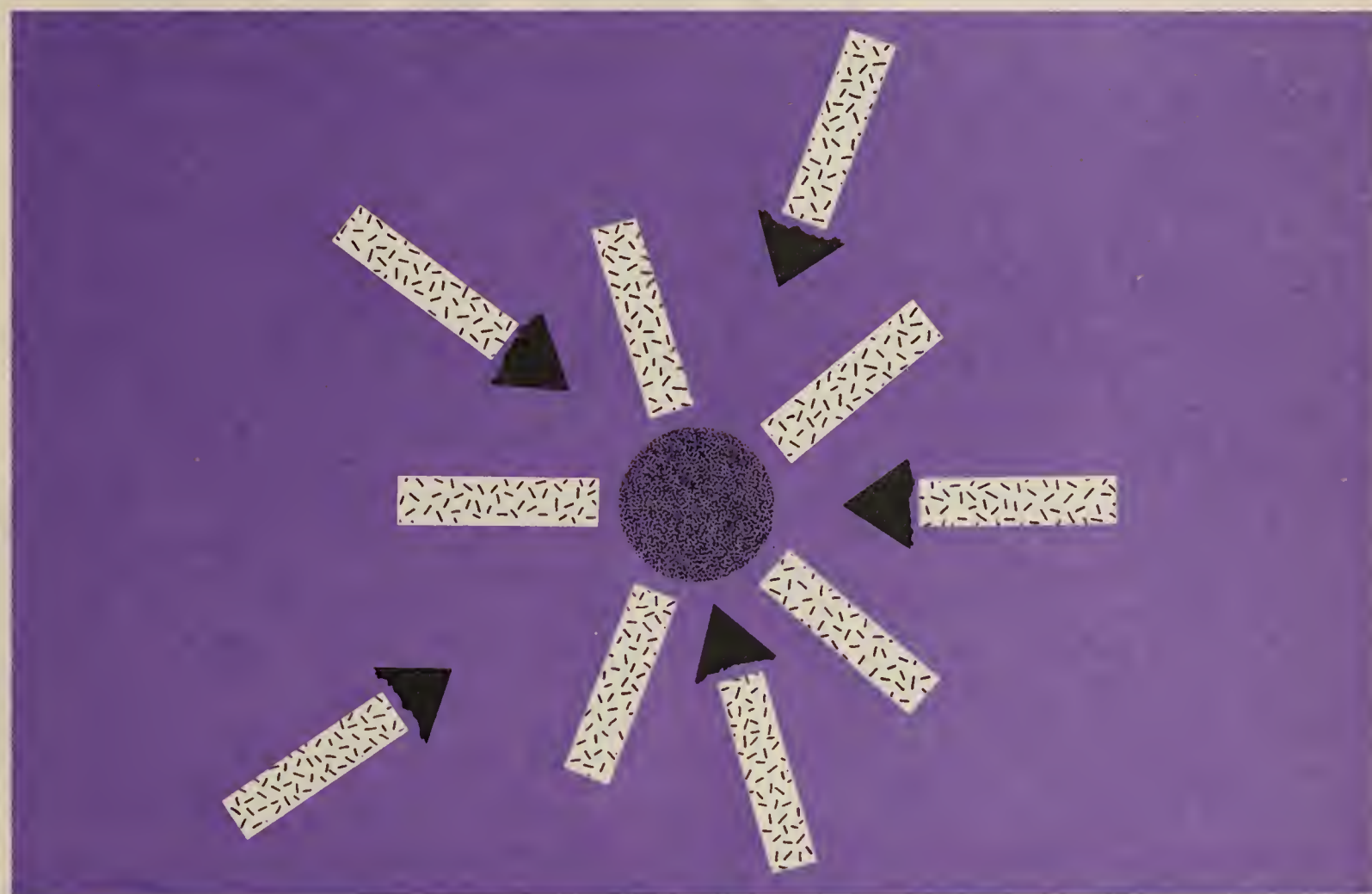
other LANs. Both satellite and terrestrial connections are used to connect sites throughout Southern California and as far away as Tucson, Ariz.

All major Hughes sites are linked via 1.5M bit/sec. T1 lines; smaller sites are served by 56K bit/sec. links, Covert said. A new multiplexing system, which the company plans to install shortly, will increase that 56K minimum to 224K bit/sec. "We've got a philosophy on how to set up our Ethernet, which is to get as much bandwidth as cheaply as we can to provide for peak periods," Covert said. "We don't care if the bandwidth gets used completely or not."

Response time guaranteed

The payoff from this generous use of bandwidth is that it guarantees users acceptable response time at all times — even when they are accessing a DEC VAX on a remote LAN at peak business hours. "The worst times we've seen of Ethernet users, only 12% to 14% of our total bandwidth is being used, even at the main backbone," which supports incoming traffic from multiple nodes, Covert said. Usually, only 3% of available bandwidth is used, he added.

While Ethernet is the standard network protocol used by all Hughes sites, a variety of Ethernet types — 64, to be exact — are used by individual locations. Approximately 1,000 nodes communicate via DEC's Decnet communications protocols, while more than 2,000 use Transmission Control Protocol/Internet Protocol. This is the main reason the company chose to use bridges, which make no distinction between different types of upper-level networking protocols, rather than routers, which only recognize one type of protocol, according to Covert.



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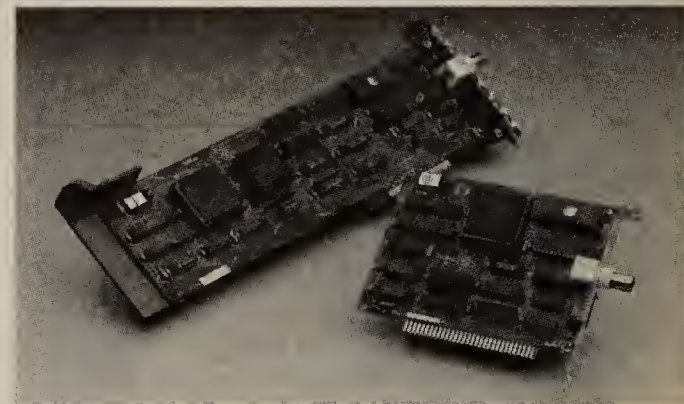
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Fiber LANs

CONTINUED FROM PAGE 51

and computers.

"Fiber is coming on strong in graphics-oriented applications, where pictures are truly worth a thousand words," says Richard Cerny, president of Trellis Communication Corp., a networking design and management firm in Salem, N.H. "There is also the need for high-speed transfer in the scientific world, where you have a tremendous amount of compute-intensive information that has to be sent at super-duper speeds. That takes fiber."

Overkill?

Some industry sources still doubt whether there is significant need in the LAN market for fiber's whopping 100M bit/sec. bandwidth. "It's like trying to crack a walnut with a sledgehammer," says Larry R. DeBoever of DeBoever & Associates. "I'm bullish on fiber as a backbone [to connect multiple LANs], but if we can get 10M bit/sec. on dedicated twisted-pair, why do we need fiber? Even with 1M bit/sec., we're still rich in bandwidth."

But what may now seem like overkill may soon be essential. Fiber proponents say that as high-speed workstations filter down from the high-tech departments to the desk top, many will have a fiber-optic cable trailing behind them. Leading the way is a new generation of 15M to 25M bit/sec. workstations that Sun, Apollo, Tektronix and Hewlett-Packard are expected to announce this year.

Several vendors have already incorporated fiber's high bandwidth capacity into host-to-host networks. In January, Fibronics International, Inc. and Control

Data Corp. signed a joint development agreement to link CDC's Cyber line of computers with Fibronics' Finex, a 100M bit/sec. fiber-optic network.

"Whereas the networks of the past few years have been a couple of hundred units, we now see 2,000 to 3,000 workstations on a network," says Bob Chiras, group marketing manager for workstation manufacturer Apollo Computer, Inc. "We're beginning to see a lot of demand for very high-speed corporatewide networking, and we're convinced fiber is going to be a part of that."

Another factor in fiber's spread to the user's desk top is its resistance to electronic interference and tapping by unauthorized users. Security considerations were the primary reason Mitre Corp.

chose fiber for its IBM Personal Computer network, according to Mitre systems engineer Delores Derrington.

"We're working with some sensitive data and know if we've just laid the cable that no one has messed with it," Derrington says. Although the network's bandwidth capacity is greater than Mitre's current needs, the firm plans to add high-power workstations and video to the LAN.

For some, however, performance gains are offset by current cost issues. Even though fiber cable is less expensive than most wire media, the price tag on fiber-optic transistors and transceivers—which is often two to five times higher than similar units in a twisted-pair setup—stifles many potential users' interest.

"We did some quick adding and figured that if we wired 30 rooms with fiber, we're talking at least \$21,000. We did our whole twisted-pair wiring job for \$3,000," says Bob Johnson, telecommunications manager at the University of Washington in Seattle. "I can't imagine why anyone would want to use fiber to link individual machines unless they had money to burn."

"The cost is coming down, but the price per connection is still about twice that of twisted-pair or coaxial. And that's a significant difference for the small user," says Matthew West, president of Network Architects, Inc., a networking design firm in Marietta, Ga. "It still needs to come down considerably before it will make any great impact in the LAN area."

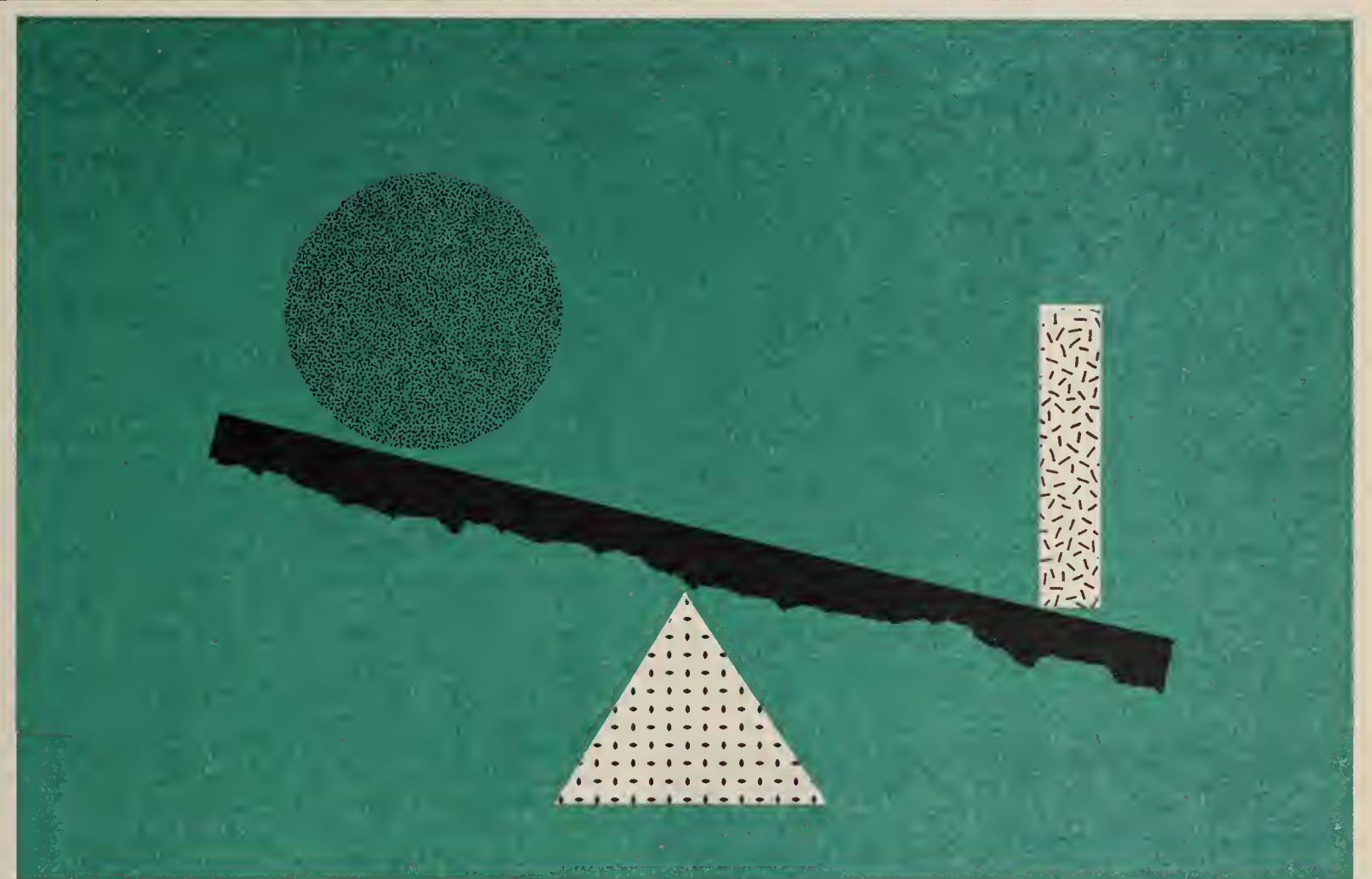
BIT BLAST

Wang joins GTE trial

Wang Laboratories, Inc. announced its participation in GTE Florida's Integrated Services Digital Network (ISDN) trials in Tampa, Fla. Wang is supplying PC 280s to demonstrate simultaneous data and voice transmission. The personal computers, equipped with ISDN cards, are linked via a modular telephone jack to a 64K bit/sec. ISDN Basic Rate Interface channel running over twisted-pair wiring. The connection links workstations to either a Wang host or an AT&T 5ESS switch at GTE Florida's central office.

The federal government spent \$2.7 billion on telecommunications products and services in fiscal 1987 and will spend \$3.8 billion in fiscal 1992, according to a report by Mountain View, Calif.-based research firm Input. The figures represent an average annual growth rate of 7% in government telecommunications expenditures during that five-year period.

NCR Corp. has announced plans to license Santa Monica, Calif., software company Retix's Open Systems Interconnect (OSI) networking software for use on all NCR computer systems. NCR plans to implement Retix's protocol software from the data link layer up through the application layer of the OSI networking standard, the company said.



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3+ Open

FROM PAGE 51

vide at least two more releases — one this spring and another this fall. There are no plans to provide a Unix version of 3+.

Currently, 3+ supports DOS and Apple Computer, Inc. Macintosh workstations. Support for an OS/2 client will be added this month, followed by 3+ Mail for an OS/2 client in June, 3Com said.

3+ Open is slated to ship in three phases. The initial phase will be introduced in June with general availability during the summer. It is said to include the LAN Manager and support for Microsoft MS-DOS and OS/2 clients, as well as 3+Share, 3Com's XNS protocols (to ensure support for 3+) and 3+Start, a two-server system for DOS and OS/2 workstations.

In the fall, 3Com said it will port its basic services to OS/2 as outlined above and provide dedicated server support for DOS and OS/2 clients as well as support for subsidiary Bridge Communications' protocols and services — including NCS, GS and PCS/1 — and Motorola, Inc. 68000-based Transmission Control Protocol/Internet Protocol.

In 1989, 3Com said it will top off 3+ Open with Macintosh support, fault avoidance (disk and file mirroring), IBM 3270 and LU6.2 gateway services, IBM Netview integration and Net Manager.

AT&T gives users telephone tap

BY JEAN S. BOZMAN
CW STAFF

LISLE, Ill. — AT&T Network Systems offered its largest end-user customers potential control of their portion of the AT&T network late last month when it announced a new customer-site product called Net Partner.

The product allows end users to monitor and diagnose faults on Centrex and Integrated Services Digital Network (ISDN) lines that are switched through an AT&T 5ESS switch at the local telephone company. It also provides a way for the user to send network statistics to IBM's Netview network management system running on an in-house mainframe, AT&T said.

Net Partner combines a Sun Microsystems, Inc. Sun-3/60 workstation at the customer site

with AT&T software running on an AT&T 3B2 600 at the telephone company offices. What the customer sees is a series of green icons, which represent all his phone and data lines, as well as a listing of network alarms that should be tested and checked.

For the first time, the customer will be able to monitor and test his own lines before the Bell operating company does and to alert the local telephone company if the problem is not repaired quickly, AT&T said. Flashing orange or red icons signal trouble to the network manager sitting at the customer site's Net Partner console.

Fred Chanowski, president of Chanowski Telecommunications Management Corp. in Needham, Mass., said that such end-user control is critical to the success

of ISDN and other AT&T network services at large user sites. "Before this, the customer was two or three steps removed from the applications processor that was managing his Centrex lines," Chanowski said. "Often, he had to call the regional telephone company to get repairs done."

Test takers

The Net Partner system was tested at McDonald's Corp. during that company's one-year trial of ISDN, according to Don Render, vice-president of product management for AT&T's Operations Systems group. Now, more than a dozen corporate customers are asking to test the system.

AT&T hopes to package Net Partner with new ISDN installations at Bell operating compa-

nies and at corporate sites, Render said.

Some Bell operating companies have expressed reservations about giving corporate customers the ability to peer into their central office operations and track how quickly repairs are carried out, said William Marx Jr., executive vice-president of marketing and customer operations at AT&T Network Systems.

"You're opening the window to what's going on inside their house," he admitted, "and it will be a new way of doing business." However, "most telephone companies tell us that they see the opportunity to grow their revenues this way," Render said.

The product will be available to end users by fall through the Bell operating companies and independent telephone companies, which will set the price and provide some custom features, according to AT&T.

Passmore

FROM PAGE 51

Unlike PC network operating system protocols, Appletalk protocols were designed from scratch to support peer-to-peer resource sharing across network workstations, in contrast to Novell and 3Com's server-based approach.

Appletalk was originally designed to support direct communications between any pair of

network nodes, including communications with intelligent printers like the Laserwriter. This capability has been exploited by one product, the TOPS network operating system from Sun Microsystems, which allows Macintoshes to directly share each other's files, eliminating the need to dedicate one or more workstations to the job of making shared files available to network nodes.

For those who do not want a dedicated server configuration, the Appletalk Filing Protocol is supported by products like Appleshare. Users don't need to purchase network operating system software, either: Appletalk protocols are supplied with standard Mac system software.

Hardware advantage

It's in the area of LAN hardware that Appletalk is radically different from IBM PC products: Instead of requiring a LAN interface card, every Macintosh and Laserwriter has a hardware interface to Appletalk built-in.

The same Mac communications chip and port that supports serial communications to an attached modem is reprogrammed for Appletalk to support balanced transmission at 230K bit/sec. over twisted-pair cable. Consequently, the only Appletalk hardware connection cost is approximately \$50, which is for the interface cable.

Appletalk's relatively low speed would seem to limit its utility, yet such is not necessarily the case. While Ethernet and Token-Ring networks operate in the multiple megabit-per-second range, the actual speed of data transfer between PCs is usually limited by LAN protocols and most PC hardware to no more than about 200K bit/sec.

A real limitation of Appletalk's relatively low speeds is the

maximum number of nodes supported on a single LAN. Even this obstacle can be overcome by segmenting larger Appletalk nets into multiple networks, each with fewer Macintoshes.

Nonetheless, for users with higher speed networking requirements, the Appletalk protocols are now supported over 10M bit/sec. Ethernet. This configuration, called Ethertalk, is supported by Apple hardware for the Mac II and by multiple third-party vendors for the Mac SE and the DEC VAX. To distinguish the Appletalk protocols, which can, in theory, run over any type of LAN, from the Appletalk 230K bit/sec. hardware, Apple now refers to the protocols as Appletalk and has renamed its hardware LocalTalk.

Apple-DEC support

Appletalk protocols running over Ethernet are expected to assume a major role in the recently announced Apple-DEC alliance. Because Ethernet is transparent to higher layer protocols, customers can simultaneously use the same Ethernet LAN to support Digital Network Architecture/Decnet protocols between VAXs and Appletalk protocols between Macintoshes and VAXs. These Apple-to-DEC links for the VAX already exist in products from Alisa, Pacer and Odesta.

Appletalk's low cost and ease of use could help it gain acceptance as a network for microcomputers other than the Mac. For example, an Appletalk network of IBM PCs, Unix workstations and intelligent laser printers might be created to support file sharing and Adobe Postscript printing, using TOPS products. There have been rumors that Tandy is considering the use of Appletalk with its next generation of PCs.

So is Appletalk a real LAN? In a recent article by Bob Metcalfe, the inventor of Ethernet and founder of 3Com, Metcalfe predicts which LANs are likely to survive and prosper through the year 2000. The four winners are Ethernet, Token-Ring, Fiber Distributed Data Interface and Appletalk.

Metcalfe states that today, Appletalk is second only to Ethernet.

What he did not say is that with the recent success of the Macintosh and the high percentage of Appletalk LAN installation by Mac users, there may soon be more Appletalk nodes installed than either Token-Ring or Ethernet. So while Appletalk may be the Rodney Dangerfield of LANs, it's more than worthy of respect.

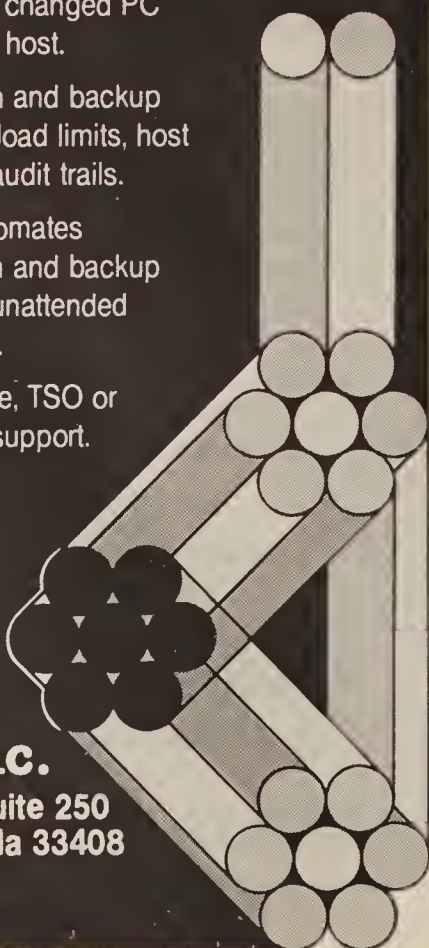
Passmore is a principal with Network Strategies, Inc. in Fairfax, Va.

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FCC's price cap scheme for AT&T put on hold

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Federal Communications Commission's plan to dramatically reform the way it regulates the price of AT&T long-haul services is bogged down in political problems.

And managers of business networks think that's just fine, because they believe the proposal needs a lot more scrutiny, according to Kenneth L. Phillips, vice-president of telecommunications policy at Citibank NA and chairman of the Committee of Corporate Telecommunications Users (CCTU).

The FCC's proposal to replace traditional rate-of-return regulation with a price cap scheme was announced with great fanfare last August by Dennis R. Patrick, the Republican chairman of the FCC.

The proposal would put an end to regulating the rate of return of dominant carriers — which could mean a big boost for AT&T's profits — and instead would place an annual ceiling on prices [CW, Aug. 10, 1987]. Patrick argued that his plan would give AT&T a profit incentive to cut costs and operate more efficiently, while protecting consumers from excessive prices.

However, the plan has been greeted with skepticism in many quarters, including the U.S. Congress, AT&T's competitors and users groups, such as the CCTU and the International Communications Association (ICA).

One concern of the users groups is that the initial level of price caps may be set too high or that the annual adjustments may allow the price caps to rise too fast.

In Congress, Democrats are trying to delay the action until after the November presidential elections, several observers said, in hopes that the next president will name a new FCC chairman.

"There's going to be a radical change

in the cast of characters at the commission, regardless of who wins the election," Phillips said.

The ICA and the CCTU are supporting bills that would delay Patrick's price cap scheme until after a new presidential administration is in place in January 1989.

"Congress doesn't trust the FCC, which may produce some automatic resistance to FCC proposals," said Rep. Al Swift (D-Wash.) at a recent trade show.

"In general, there is some congressional concern that the FCC will ram through some controversial rule changes without setting aside adequate time to discuss their merits," said George R. Dellinger, a telecommunications analyst at Washington Analysis Corp.

Patrick can mollify Congress by issuing a more detailed proposal at a forthcoming FCC meeting, to be held either March 24 or April 21, Dellinger said.

The ICA said it may support the price caps, but only if there is evidence that the new system will protect rate-payer interests better than the current regulatory system. In its official filings, the ICA complained that the FCC has spent more time developing broad new policies than it has on enforcing the current regulations and addressing such issues as strategic pricing of special access services.



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Driven by a powerful Network Control Language, NET/MASTER not only helps decrease downtime, it helps cut costs at Northwestern Mutual. As VTAM Specialist George MacDonald points out, the system's multiple sessions capabilities have allowed his company to delay hardware purchases and, in many cases, hardware upgrades as well as improve productivity. "I wouldn't want to have to manage a network like ours without something as high quality

as NET/MASTER," said MacDonald, whose company also utilizes SUPRA™ and MANTIS® from Cincom. "There's just no way in the world to do it."

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Fiber-based net adds miles to host channel

MINNEAPOLIS — Two fiber-optic channel extenders recently introduced by Network Systems Corp. are said to support IBM host-to-host and host-to-peripheral connections of up to 1.5M bit/sec. over distances of several miles.

The Fiber Link 2000 (FL2000) and Fiber Link 5000 (FL5000) are said to provide users with the same level of performance within a radius of a few miles as is provided over local, channel-based connections. The link can be used to extend channel speeds from the host out to channel-attached peripherals and data entry terminals or as a link between one or more mainframes.

The products will fill a gap in the vendor's Remote Device Systems networking products, which currently support channel-based connections over either local links or long-distance T1 connections, Network Systems said.

Above-average medium

The fiber medium was chosen because of its high bandwidth, lack of vulnerability to electrical disturbance and other outside interference and its ability to support signals over distances of several miles, the company said.

The FL2000 handles network distances of 2 km; the FL5000 handles up to 5 km. Each product can be configured as either a standard-performance or high-performance model.

Standard performance supports approximately 43K byte/sec. over distances of 2 km, and 60K byte/sec. over 1 km. A high-performance model can handle speeds of up to 1.4M byte/sec.

Prices range from an FL2000 standard-performance model at \$17,500 to a high-performance FL5000 for \$44,500.

Make these "people" laugh, and you could win \$100 worth of software.



Announcing the 1988 Computerworld button contest!

Every year, as all you button freaks know, *Computerworld* distributes tens of thousands of buttons at trade shows around the country. For several years now, against our better judgement, we have been letting you, our readers, write the slogans for these buttons. To our surprise, you have written some good ones (like those shown here). So we're doing it again.

We're looking for a few good slogans — witty, relevant, SHORT (these are small buttons), and at least moderately clean. You may send in your entries on the form below or a copy.

But you may NOT send us everything that comes into your head. Our offices aren't big enough to handle all that paper! Please take the time to narrow down your ideas to the two best you can come up with (test them on your friends).

All entries will be shown to our panel of judges, who will be tied to their chairs until selections are complete. Six winning slogans will be picked, and everyone who sent in one of those slogans will be eligible for a prize. If you are the only one submitting a particular slogan that wins, you, of course, get the prize. However, if more

than one person had the same intelligent idea, we'll pick the prize winner out of a hat. Prize winners will receive a \$100 certificate good towards the purchase of software from a friendly neighborhood computer store.

All decisions of the judges will be final, and no representations as to their competence, skill, or sense of humor are being made. All entries will become the property of *Computerworld*. Deadline for entries is **March 18, 1988** at our offices in Framingham, MA.

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NEW PRODUCTS

Local-area network hardware

Amnet, Inc. has added the Nucleus 7200 X.25 Concentrator to its family of Nucleus 7000 wide-area network products.

The Nucleus 7200 X.25 Concentrator is said to optimize communication line costs for connection to public and private wide-area networks including packet-switching networks. It is reportedly capable of supporting up to 20 ports that implement the CCITT X.25 interface at speeds up to 256K bit/sec. The concentrator can also handle 2,000 simultaneous user circuits with a throughput capacity of 750 data packet/sec.

A four-port configuration of the Nucleus 7200 costs from \$5,695.

Amnet, 1881 Worcester Road, Framingham, Mass. 01701. 617-879-6306.

Local-area network software

The Software Link, Inc. recently upgraded Lanlink, its software-based local-area network.

Lanlink 5X allows a data transmission rate of a 0.5M bit/sec. or higher, depending on hardware, the vendor said. It uses a standard parallel port and customized cabling to communicate with the file server and other computers in a work group.

Features include multitasking, remote modem access, print spooling, local printing and a nondedicated server.

It requires 32K bytes of random-access memory on the server for each satellite workstation on the network.

Lanlink 5X costs \$125 for each satellite. The network multitasking option costs \$195.

The Software Link, 3577 Parkway Lane, Norcross, Ga. 30092. 404-448-5465.

Network management

A management control facility has been introduced by Case Communications, Inc. for use with its Case Data Concentrating Exchange (DCX) Series communications processors.

The Case NCAM2 option board replaces the NCAM1 module. It plugs into an existing expansion slot in the DCX multiplexer and acts as an interface to the Case 5000 Series Network Management System. Users can monitor, diagnose, control and configure DCX networks through centrally located network management software.

Up to 14 intermediate NCAM2 boards can be used to link DCX multiplexers to the head NCAM2 board.

Head NCAM2 boards cost \$2,500. Intermediate and slave boards cost \$2,300.

Case Communications, 7200 Riverwood Drive, Columbia, Md. 21046. 301-290-7710.

Links

A remote controller for IBM 3270 communications that provides multiple concurrent host communications and IBM Token-Ring local-area network support for both Type A and ASCII devices has been announced by Harris Corp.'s Data Communications Division.

Called the H174-32R, the controller is capable of supporting up to 32 standard Type A devices with connections for an additional 24 asynchronous devices or hosts. The unit also supports standard synchronous line speeds of 64K bit/sec. using IBM Systems Network Archi-

itecture protocols.

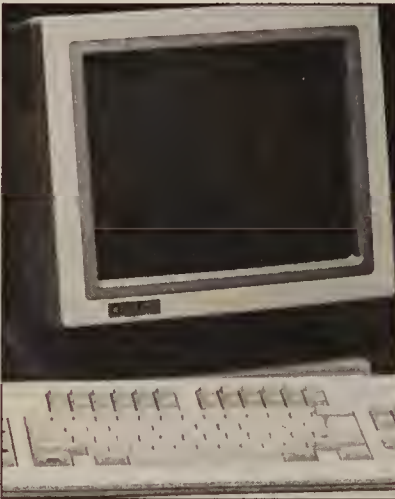
The H174-32R is priced at \$9,950.

Harris, 16001 Dallas Pkwy., Dallas, Texas 75248. 214-386-2000.

Protocol converters

A twinaxial/coaxial compatible protocol converter terminal has been announced by Rebus Corp. and JDS Microprocessing.

Called the Rebus 3000, the



The Rebus 3000 terminal

display terminal is said to be IBM compatible when used in conjunction with JDS Microprocessing's Hydra protocol converter. Features include support of communications processing up to 38.4K bit/sec., a concurrent operations printer port and a private command interface.

The terminal offers a standard IBM-labeled 121-key 3180 Model 1-style keyboard with 24 function keys.

The Rebus 3000 costs \$595.

Rebus, P.O. Box 36502, San Jose, Calif. 95158. 800-426-7090.

Digital Link Corp. has announced its Extended Super Frame (ESF) channel service unit, the Model DL551E, designed to permit direct connection of D1 through D4 framed data terminal equipment (DTE) to ESF-formatted T1 networks.

The unit converts D1- or D4-framed DTE signals to ESF signals. For transmission over 1.54M bit/sec. T1 networks, ESF allows on-line error monitoring. Local and remote error status conditions are reported via front-panel LEDs on the local channel service unit.

Other features include fault isolation on an end-to-end T1 network, DTE loop back and network loop back code detection and generation capabilities.

The DL551E ESF is priced at \$1,795.

Digital Link, 133 Caspian Court, Sunnyvale, Calif. 94089. 408-745-6200.

File servers

A combined remote bridge and router for Ethernet-based wide-area networks has been announced by RAD Network De-

vices, a subsidiary of RAD Data Communications.

Called the Remote Ethernet Bridge, the device includes active loops, alternate routing and node address-level security. It operates on such data link levels as single, dual, quad, T1 and M1-Cept. Forwarding data rates range from 4.8K to 2.05M bit/sec.

Made up of two cards and software, the bridge installs on an IBM Personal Computer AT. Prices start at \$6,590.

RAD Network Devices, 151 W. Passaic St., Rochelle Park, N.J. 07662. 201-587-8822.

Electronic mail

Inbox/PC, software said to provide electronic mail and file transfer capabilities for IBM Personal Computers and compatibles, has been announced by Think Technologies, a division of Symantec Corp.

Inbox/PC supports up to 100 users on a personal computer local-area network with a file server supporting Microsoft Corp. MS-DOS 3.1 or higher. It supports protocols such as Etherlink, Etherlink Plus and IBM Token-Ring and Netbios as well as RS-232 LAN products implementing the redirector model of file sharing.

Inbox/PC costs \$599.

Think Technologies, 135 South Road, Bedford, Mass. 01730. 617-275-4800.

Security

The Smart-line dial-up control and report system for monitoring dial telephone lines has been announced by Dataprobe, Inc.

Smart-line allows a user with a dial telephone to access, interrogate and control remote equipment. Smart-line provides voice response to keypad inputs, indicating current status and available control and reporting options.

Smart-line is available as a stand-alone dial line interface to be integrated into existing systems or bundled with standard switching modules.

Pricing starts at \$450.

Dataprobe, 170 Coolidge Ave., Englewood, N.J. 07631. 201-569-6464.

Modems/Multiplexers

The EM-1000 and EM-2400, integrated 1,200 and 2,400 bit/sec. modem and CCITT X.25 packet assembler/disassembler (PAD) products, have been announced by Emucom, Inc.

The products feature Hayes Microcomputer Products, Inc. Smartmodem capability and provide call and error correction over leased and dial-up lines.

The EM-1000 is a stand-alone unit that converts a 1,200 or 2,400 bit/sec. Hayes AT-compatible synchronous modem to an X.25/X.32 PAD. The EM-2400 provides full-duplex synchronous or asynchronous transmission.

The EM-1000 and EM-2400 cost \$325 and \$795, respectively.

Emucom, 25 Industrial Ave., Chelmsford, Mass. 01824. 617-256-9871.

Anderson Jacobson, Inc. has announced a series of 2,400 bit/sec. dial-up modems for use with its AJ Modular Modem System.

The AJ 2441-2 modems are compatible with the Hayes Microcomputer Products, Inc. AT command set and feature non-volatile memory and answer-back security.

The AJ-2441-2M features MNP Level 4; the AJ-2441-2C1 provides MNP Level 5.

Prices range from \$495 to \$995.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131. 408-435-8520.

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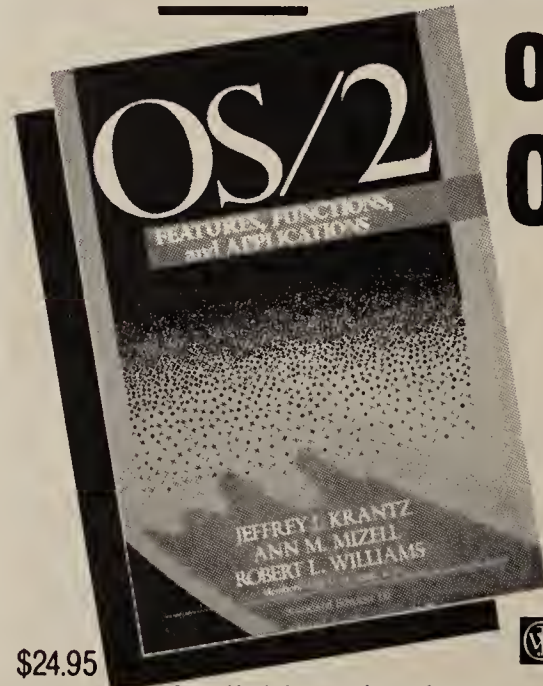
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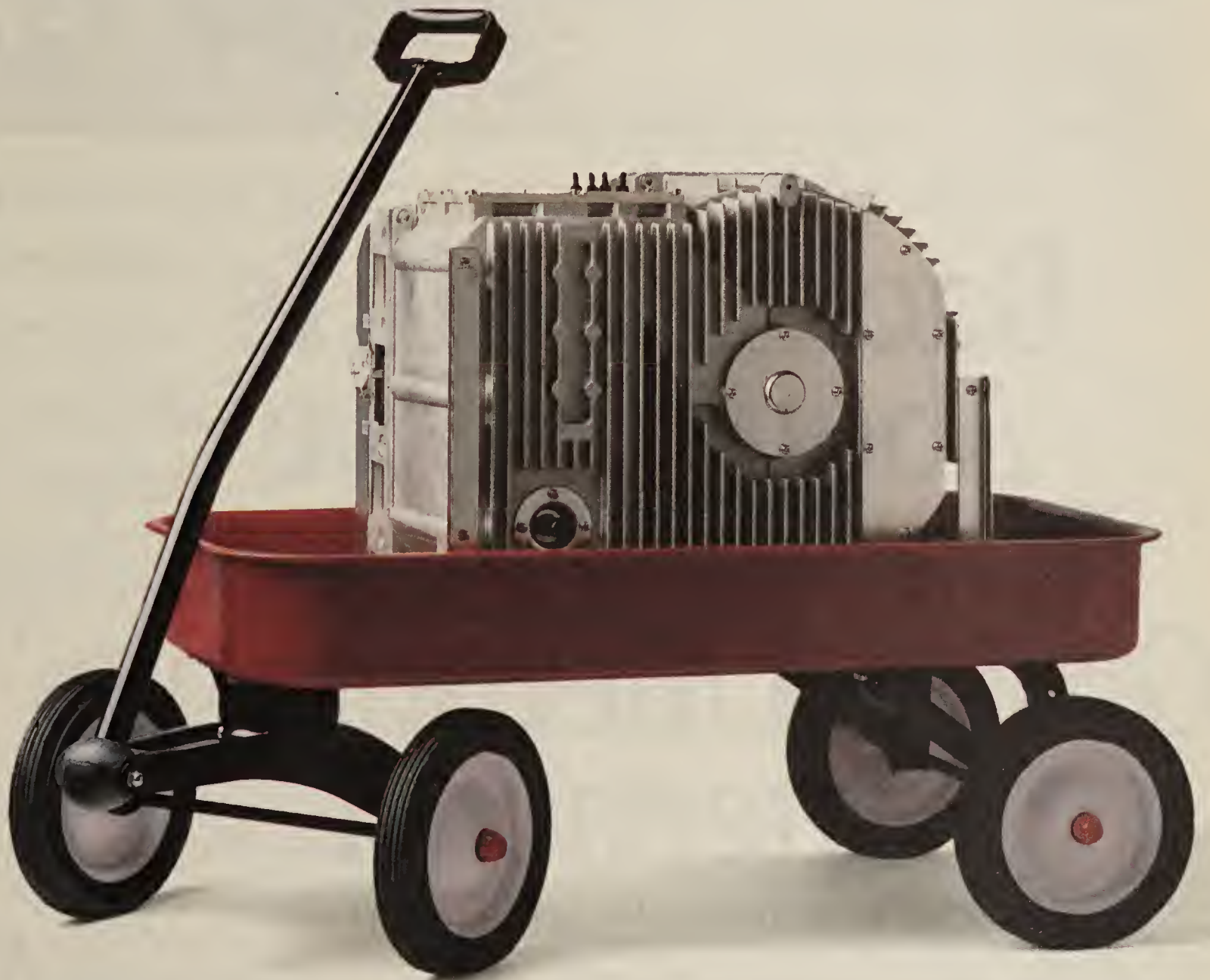
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SYSTEMS & PERIPHERALS

HARD TALK

Stanley Gibson

DEC readies '88 artillery



In November, we will have elected a new president, there will be a new world champion of baseball, and DEC will have entirely replaced its VAX line.

DEC Vice-President Bill Demmer reportedly has been traveling the country telling consultants just that. Actually, the Microvax 3000 series would be the only currently offered processor family not to be replaced. But those machines were new in September 1987, and not all have shipped yet.

So, while some are looking at DEC's surge during the past couple of years as an aberration that will soon end, it is more likely that 1988 will see a continuation of DEC's momentum. The "Marvel of Maynard" will thus cement its claim to the No. 2 position among computer vendors and keep growing.

What are the new machines, and what will they mean?

First, there is a multiprocessor system, code-named Polar Star, expected this week. This VAX, reportedly capable of performing 22 million instructions per second (MIPS), will be the cornerstone of DEC's attempt to offer a mainframe alternative to IBM.

Then there is Calypso, reportedly a Microvax 3000-based symmetrical multiprocessor that could find a niche among smaller accounts that wish to

Continued on page 71

Used CPUs hit bottom

ESA expectations seen fueling price plunge

BY STANLEY GIBSON
CW STAFF

In the months preceding IBM's announcement of MVS/ESA, the values of used IBM 3080 mainframes fell through the floor, according to leasing industry officials. But prices should not fall any farther, the officials said, even though 3080s cannot run the new operating system.

Prices for 3080s dropped so far that those machines became hard to find on the used market, as owners reportedly declined to sell them at such deflated prices.

Meanwhile, users are waiting to see whether 3090 base models will be fully upgradable to the expected enhanced 3090s, commonly known as the F models; 3090 values reflect this uncer-

tainty, leasing companies said.

The price decline for a typical 3081, from \$800,000 in October 1987 to \$350,000 in mid-February, shows that users probably had an idea of what the ESA announcement was to be, according to Svend Hartmann, president of Computer Merchants, Inc., a major leasing firm.

Flooded the market

However, Hartmann also said IBM's eagerness to sell 3090s late last year [CW, Nov. 23, 1987] caused a large number of 3080s to be displaced, resulting in too many machines on the market at once and a consequent erosion in their value.

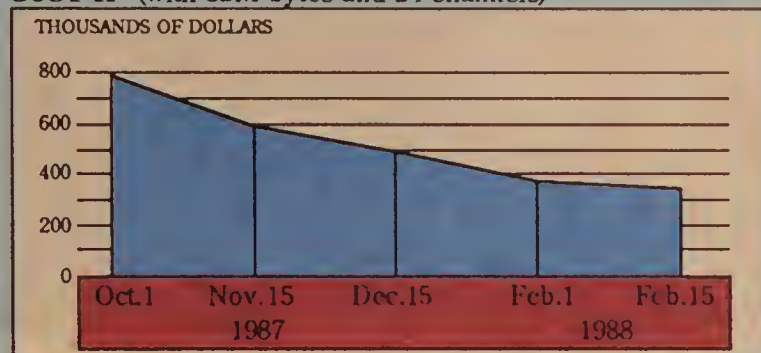
Marty Walsh, senior vice-president at Comdisco, Inc. in

Continued on page 70

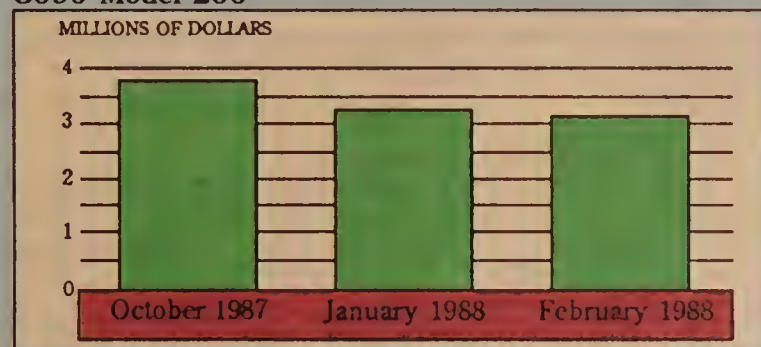
Going down

In the last six months, IBM 3080 values have nose-dived; values of original 3090s have also decreased

3081 K (with 32M bytes and 24 channels)



3090 Model 200



INFORMATION PROVIDED BY COMPUTER MERCHANTS, INC.
CW CHART

Intel plugs Fastpath into multiple networks

BY JAMES CONNOLLY
CW STAFF

PHOENIX — Intel Corp. recently enhanced its Fastpath line of channel-attached control units for IBM mainframes to allow a single Fastpath unit to support multiple environments.

In the past, different Fastpath models were needed for each link to Digital Equipment Corp. VAXs, Transmission Control Protocol/Internet Protocol (TCP/IP) networks, Manufacturing Automation Protocol networks, Open Systems Interconnect (OSI) networks and ASCII devices. Intel said each Fastpath unit now can connect an IBM 370-type mainframe to a TCP/IP network as well as a VAX, MAP, OSI or Ethernet network and ASCII devices.

Roger Thomas, general manager of Intel's Systems Intercon-

nect Operation, said the feature provides users with cost advantages by making Fastpath more flexible. He also said further enhancements are planned to allow each Fastpath unit to support three or four different connections, besides the TCP/IP link.

Fastpath is available with Advanced Computer Communications Corp. Acces/MVS software for TCP/IP connections to hosts running IBM MVS and MVS/XA. TCP/IP software for IBM's VM is available for Fastpath through third parties, according to Intel.

The feature should be available as a field upgrade in April. Base prices for Fastpath units range from \$35,000 to \$75,000, and the new feature and upgrades range from \$5,500 to \$15,000, depending on the model and configuration involved. Acces/MVS costs \$22,000.

Imagen lengthens laser line

BY SUZANNE WEIXEL
CW STAFF

SANTA CLARA, Calif. — Imagen Corp. has expanded its Imageserver XP line of laser printer systems to include an 8 page/min model based on the Canon, Inc. LPB-TX laser printer marking engine.

The 3308/S Laser Printer System features the same raster image processor used in the rest of the Imageserver XP line.

According to a company spokesman, use of Imagen's Real-Time Rasterization process provides full-page text and graphics document printing at resolutions of 90,000 dot/sq in. at a true-rated output speed of 8 page/min for letter-size paper stock.

Page management features include dual-input paper trays, *Continued on page 71*

Inside

- Intergraph announces development system for Clipper 32-bit microprocessors. Page 72.
- AK Systems introduces IBM format tape system for CAD/CAM applications. Page 72.

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Aviv shifts 3480 focus to minis

WOBURN, Mass. — Aviv Corp. has migrated IBM 3480 cartridge tape technology downward from mainframes to the minicomputer level with the introduction of 3480 media-compatible tape systems for Digital Equipment Corp. VAX and Mi-

crovax, Sun Microsystems, Inc. and Data General Corp. computers.

The TFS 3480 is aimed at organizations in which IBM mainframes and those smaller systems share environments and users need to exchange data

among departments.

The tape subsystem uses 220M-byte cartridges and was designed to be compatible with Aviv's Multiport static-switching system, which the company said allows up to six non-IBM hosts to share a single TFS

3480 system.

The TFS 3480 is available in single- or dual-drive configurations. The dual-drive system features dynamic dual-porting, which allows simultaneous access by two hosts at a transfer speed of 1.5M byte/sec. per host.

A single-drive system costs \$63,400, and a dual-drive system costs \$80,650.

Used CPUs

FROM PAGE 69

Rosemont, Ill., the nation's largest computer leasing firm, agreed that IBM's aggressive 3090 sales efforts targeted at its large accounts contributed to the 3080 price drop.

Hartmann said that prior to the ESA announcement, 3080 values had become so low that many users were declining to sell those mainframes at such depressed prices.

"We reached a point where supply began to dry up. There are indications that prices have bottomed out. I believe they have. At these low rates, people will not sell," Hartmann said.

Walsh said prices are up slightly from three weeks ago. A 3081's value has increased about \$20,000 from its level in the \$300,000 to \$400,000 price range.

In the 3090 market, Hartmann said that doubt as to whether the 3090 base models will be fully functional under the ESA operating system has prompted softness in the values of those machines.

E models only

"Most buyers do not want the original models, only E models. They are afraid IBM will make a distinction between plain and E models — in software, in the ability to run ESA and so on," Hartmann said.

"The original models were already very soft. The effect of ESA may have been anticipated," he added. Nonetheless, the current ability of 3090s to upgrade to E models has "put a floor" under that soft demand, Hartmann said.

Per Flaatten, an IBM analyst at Arthur Andersen & Co. in Chicago, said there is little likelihood that IBM will not allow upgrades to F machines.

"I don't see how they could refuse to upgrade. It would severely damage IBM's credibility," Flaatten said. He suggested that upgrade prices could be raised if customers opted to buy used 3090 base models and have IBM upgrade them, rather than buying new E models. He added that the 3090 base models would be upgradable until the Summit line, IBM's mainframe successor series, is announced.

International Data Corp. analyst Francis Gens said there is little chance that 3090 base models would ever be unable to upgrade to ESA-capable machines.

Comdisco's Walsh agreed. "All indications are that you will be able to upgrade to the F models," he said. Users of XA operating systems may see fit to wait until the F models and upgrade options are announced, Walsh said, pointing out that currently, XA systems offer nearly as much functionality as ESA.

How to Buy Time for Your IBM 308X.



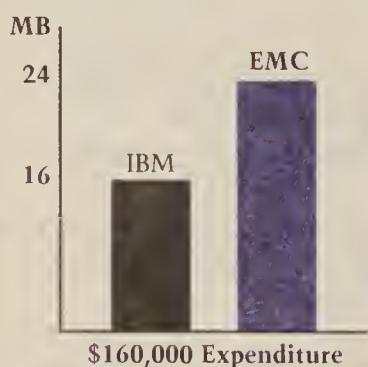
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IBM. A 16MB upgrade from IBM is priced at \$160,000. For that same price you could buy 24MB of EMC main storage. That's an additional 8MB of main storage or a savings of \$50,000. Either way you save with EMC. EMC also features coterminous leases and trade-up credits so the return on your investment continues after your purchase.

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EMC is the leading independent manufacturer of main storage upgrades and other system enhancement products for mainframe and mid-range computers. All EMC products are supported by our worldwide network of sales and service offices.

5. Call EMC.

If you're interested in buying time for your 308X system, call EMC today at 800-222-EMC2 for your [free information kit](#). Our 308X upgrade is the "midlife kicker" that saves you money and improves your 308X's performance.

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Gibson

CONTINUED FROM PAGE 69

run more than one operating system.

Key to both of these computers will be the expected Version 5 of DEC's VMS operating system, which will, analysts say, permit peer multiprocessing. Version 5 reportedly will also allow up to 32 VAXs in a cluster. Multiplying 32 times the 22 MIPS expected with Polar Star yields 704 MIPS. Whether that number is realistic in practice and exactly how the system can be used are other questions, but such a cluster could be yet another customer option.

Just the thought of such massive clusters connected to each other reinforces DEC's pet slogan, "The network is the computer."

Hints of things to come

In the meantime, there are reports of a desktop VAX and a large, uniprocessor VAX that will be water-cooled. And the Vaxstation 8000 three-dimensional graphics workstation introduced just a few weeks ago must not be overlooked.

Indeed, by this time next year, DEC will be offering a larger number of VAXs than ever before for an extremely broad range of uses. All these products will be integral Decnet nodes.

By next year, DEC's multivendor networking strategy, recently announced as Network Applications Support, will be more fully developed. Building on an anticipated set of tools, the Apple Macintosh will be a fully functioning Decnet node by the fall.

DEC's new products will have to be well done, of course. There will have to be appropriate applications. And marketing efforts will have to be successful. But there are signs that DEC is fully capable of these things.

There is talk that DEC will offer transaction processing software and vertical market applications for banking and insurance developed by key large ac-

JUST THE THOUGHT of such massive clusters connected to each other reinforces DEC's pet slogan, "The network is the computer."

counts. DEC's sales and support have been receiving higher and higher marks.

What could trip DEC up?

In the past, DEC failed with personal computers when it didn't have a clear strategy. In the PC market, there just wasn't room for an uncertain commitment.

But there is no evidence that DEC doesn't know what it's doing this time around. The methodical way in which the VAX line has been expanded and the

schedule of upcoming announcements show that DEC has developed, and is following, a clear blueprint.

With its broad line of products, DEC should be highly attractive to new accounts, from mechanical engineering customers who need 3-D workstations to banking and insurance firms that require transaction processing.

But these new products will also be offered to existing DEC customers, giving them little reason to look elsewhere for

their computing needs. A DEC customer will have to be very imaginative to find a need that DEC will be unable to fill.

So, even if DEC does not poach in IBM territory, it will be able to grow in a very healthy way by selling products to new and existing accounts.

By early 1989, it is probable that DEC will have gone way beyond the point of being a transitory supernova illuminating the sky only to fade, as others have in the past.

Indeed, if the DEC of the past few years — a company with a few good mini-computers and solid networking — threw a fright into IBM, what will the DEC of 1989 do?

Gibson is a *Computerworld* senior writer.

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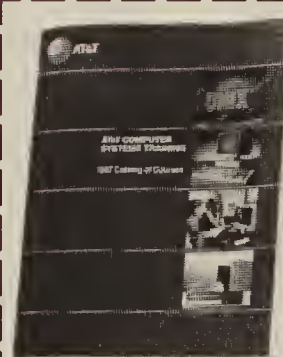
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Imagen

CONTINUED FROM PAGE 69

each of which holds 200 pages; a 100-page output tray; faceup- or facedown-selectable output; and the ability to accommodate different sizes and types of paper. Automatic duplex printing is also standard.

The printer offers a 300,000-page five-year rated lifetime, the spokesman said, as well as a duty cycle of 6,000 page/min. It allows direct connection to Ethernet networks, making the printer suitable for work group environments, he added.

The 3308/S reportedly uses Imagen's multiple language support software, enabling it to accept output written in Imagen's Impress page-description language as well as in Ultrascript, its Adobe Systems, Inc. Postscript-compatible emulator.

Other standard emulations include Tektronix, Inc.'s 4010/4014 graphics terminal, Epson America, Inc.'s FX+ and IBM's 5152 dot matrix printer.

The Imagen 3308/S Laser Printer System is upwardly compatible with other Imageserver XP printers.

Priced at \$10,950, it will be available this month, the vendor said.

NEW PRODUCTS

Processors

The Intergraph Advanced Processor Division has announced a software development system for its Clipper series of 32-bit microprocessors.

Housed in a 12- by 12- by 15-

in. desktop unit, the system comes with a Clipper C100 computer engine and separate I/O processor. Also included are 8M bytes of random-access memory, a floppy disk and a 156M-byte hard disk.

Standard software includes the Clix operating system, a C

compiler, a downloader and debugger, network core software and screen copy and ASCII print resources.

The Clipper Development System is priced at \$11,950.

Intergraph, 2400 Geng Road, Palo Alto, Calif. 94303. 415-852-2365.

A data acquisition peripheral that works with Digital Equip-

ment Corp. VAX computers over standard RS-232 ports at speeds of up to 19.2K bit/sec. has been announced by International Data Acquisition & Control, Inc.

Called the IDAC/1000, the stand-alone peripheral has a 32K-byte firmware operating system. It reportedly can capture eight channels of single-ended or four channels of differ-

ential analog output. Up to 16 channels of digital I/O are jumper-selectable for input or output in groups of eight.

The IDAC/1000 costs \$995.

International Data Acquisition & Control, P.O. Box 397, Four Limbo Lane, Amherst, N.H. 03031. 603-673-0765.

Data storage

A tridensity, 1/2-in. nine-track IBM format tape system for computer-aided design and manufacturing applications has been introduced by AK Systems.

The system offers 800, 1,600 and 3,200 character/in. density capabilities. It is compatible with computer systems that use VME, S-100, RS-232 or IEEE 488 buses; it is software compatible with IBM PC-DOS, Microsoft Corp. MS-DOS and Xenix operating systems.

Prices start at \$3,295.

AK Systems, 20741 Marilla St., Chatsworth, Calif. 91311. 818-709-8100.

Terminals

Moniterm has introduced 19- and 24-in. monitors for use with Sun Microsystems, Inc. workstations.

Model VY1962, a 19-in. monitor, and VL2462, a 24-in. monitor, offer 1,152- by 900-pixel displays. They are plug-compatible with the Sun-3/50, Sun-3/60 and Sun-3/100 workstation monitors.

The Model VY1989 is a 19-in., 1,600- by 1,280-pixel display that is plug-compatible with the Sun-3/200 and Sun-4/200 workstation monitors.

The Model VY1962 costs \$1,525, the VL2462 costs \$2,495, and the VY1989 costs \$1,795.

Moniterm, 5740 Green Circle Drive, Minnetonka, Minn. 55343. 612-935-4151.

Printers/Plotters

An 8 page/min laser printer with a resident Adobe Systems, Inc. Postscript controller has been announced by AST Camintonn Digital Division, an AST Research, Inc. company.

Called the AST Turbo-laser/PS, the printer also features an optional board for Digital Equipment Corp. LN03, Diablo 630 ECS and Hewlett-Packard Co. HP Laserjet Plus emulation.

The printer is based on the Ricoh Corp. 4081 engine. It offers 3M bytes of random-access memory and 1M byte of read-only memory. Full-page graphics are printed at a resolution of 300 dot/in., and 250-sheet I/O trays are standard.

The AST Turbolaser/PS costs \$4,595; the emulation upgrade is priced at \$595.

AST Camintonn, 2121 Alton Ave., Irvine, Calif. 92714. 714-553-0247.



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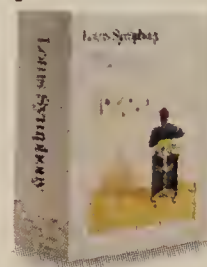
depth of each Symphony application is not sacrificed for the sake of integration. Each function is powerful enough to meet the user's growing computing needs. In fact, the Symphony spreadsheet is based on the same technology as 1-2-3®, the industry standard.

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EXECUTIVE REPORT

AIRLINE MIS

Carriers land profits by empowering DP units

BY ELISABETH HORWITT

Airline carriers are squeezing their information systems for all they're worth.

Industry leaders have discovered they can leverage their systems to raise the bottom line in two important ways. They can turn a profit from reselling internally developed software and services, which eventually evens out the cyclical earnings of air transportation.

They can also improve the effectiveness of internal operations and support value-added services that generate more business.

As a result, airlines are counting on their computer systems more than ever to help them stay aloft in today's turbulent, deregulated market.

"The purchase of Eastern Airlines and its information services subsidiary System One was a crucial part of [Chairman and Chief Executive Officer] Frank Lorenzo's strategy" for growth and for developing products that differentiate Texas Air from its competitors, says David Hultsman, staff vice-president of technology planning for System One Corp., now Texas Air's information processing subsidiary.

Texas Air effectively tripled the MIPS power of its major data processing facility and turned itself into a third-party networking provider in order to ensure virtually unlimited bandwidth for networking applications in the past year, Hultsman says.

That airline company is not the only carrier with large MIS and communications expenditures.

Airlines increased their communications budgets an average of 26.2% from 1986 to 1987 —

Horwitt is a *Computerworld* senior editor, networking.



- **Independent MIS subsidiaries.** Major airlines have broken their DP departments into separate subsidiaries that are expected to be profitable in their own right.

- **Competitive in-house operations for customer service.** Even the traditional DP role of supporting in-house operations has taken on a competitive edge, with carriers racing with each other to recover from bad press on their customer service and safety records.

But is the expense of these new systems and networks worth the price?

In a competitive market such as this one — yes. That is, if the development of a new product allows a carrier to recoup development or installation costs through resale, like the Texas Air network, or bring in additional business and profits, like many of the airline reservation systems currently in use.

And the profits can be significant. According to an American Airlines spokesman, operating earnings for its Sabre reservation system were \$107 million in 1987. Operating earnings for AMR Corp., American's parent company, according to a preliminary unaudited report, were \$198.4 million. That means Sabre's revenue was 54% of total company revenue.

The key to service

Computer systems have spearheaded campaigns by Texas Air and its rivals to restore customer confidence in airline safety and service levels.

"We want people to see Continental and Eastern as the most reliable systems going in terms of having baggage go to the right place and finding your seat assigned when you get on a flight," System One's Hultsman says.

"It would be a real competitive advantage to provide this in a shorter time frame than

INSIDE

Expert system assigns gates for United

Page 74

FAA updates traffic control network

Page 76

the largest jump by any industry, according to a recent survey by the International Communications Association.

"Carriers are right up there with insurance companies as far as MIS outlay goes," says William Maybaum, a vice-president at DMW Group, Inc., an Ann Arbor, Mich., consulting firm. "All the major airlines are building systems to meet upcoming requirements and to supply ser-

vices, and it's all roll-your-own code."

Airlines have moved in three directions to accommodate today's market pressures:

- **Travel reservation systems.** Ever since United Airlines and American Airlines developed their reservation systems in the late 1970s, carriers have been using computer systems to lure customers away from the competition.

Carriers

FROM PRECEDING PAGE

anyone else," he adds.

Airline spokesmen admit that deregulation and the spate of mergers that followed have made it increasingly difficult for computer systems to track and coordinate various key operational areas.

American, for instance, has had to steadily upgrade its IBM mainframe capacity, beginning in the late 1970s, "to get us over the deregulation hump," says Joseph Selman, a senior representative for corporate communications at AMR.



I AGREE with people who have been saying that deregulation would have been impossible without the technology to support it."

DAVID HULTSMAN
SYSTEM ONE CORP.

"The big impact [to American's systems] came a couple of years back, when you had volatile fares and a vast number of airlines flying to places they never had before," Selman says.

Today, American's Sabre system handles as many as 1.5 million fare changes overnight "when a price war kicks off,"

Selman adds.

Recently formed conglomerates, like Texas Air, Northwest Airlines-Piedmont Aviation and Delta-Western, are all still in the process of merging their MIS operations.

For example, Texas Air has had to set up high-speed communications links between Continental Airlines and Eastern data centers to keep track of "flights in the air, on the ground, preparation for new flights — it's a very complex situation," Hultsman says.

"We've had to link Data General, Unisys and IBM computers and integrate [acquired subsidiaries'] old applications into the system, since we don't have the time to develop new ones," he adds.

Airport of the future?

Both Texas Air and United hope to bring about quick, visible improvements to customer services by revamping airport terminal systems that customers deal with directly.

United, for example, has spent 680,000 man-hours converting its new terminal at Chicago's O'Hare Airport into "a just-in-time facility," interconnecting various departments and hosts "so that a lot of things happen automatically now," says Richard Pemberton, senior technical support design analyst for United's data processing subsidiary, Covia Corp. [CW, Jan. 18].

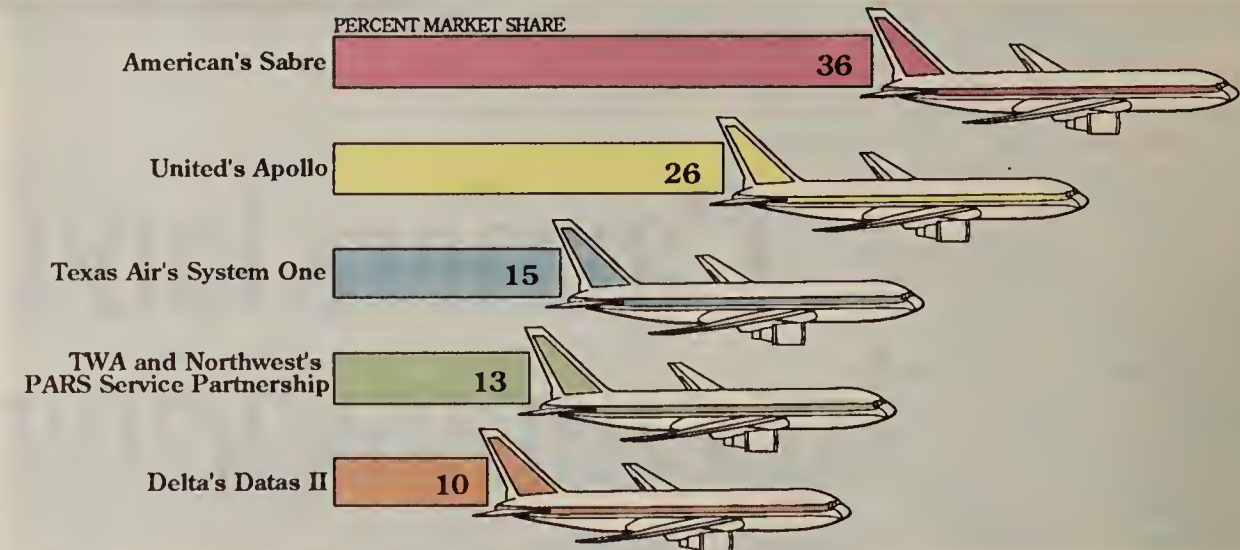
Formerly, one set of terminals accessed Apollo, United's IBM-based reservation system; a second set provided links to the airline's Univac-based flight operations and crew management system.

Today, United's terminal and public information operations at O'Hare are handled on IBM Personal System/2 Model 50s linked over an IBM Token-Ring network.

A remote gateway ties the PS/2s to United's reservation and operations systems. Users can hot-key between the two

Airlines soar for reservation systems market

American leads with 36%



INFORMATION PROVIDED BY DMW GROUP, INC.
CW CHART: FRANK C. O'CONNELL

systems, or they can call both up at once via a Microsoft Corp. Windows interface.

The ability to interact in real time with different operational areas has significantly increased operators' ability to juggle airport resources effectively and, in turn, has increased the number of flights the terminal can safely and efficiently take on, Pemberton notes.

A year and a half ago, the terminal handled 330 to 350 flights a day; today, it manages more than 400 flights.

Texas Air is prototyping an airport terminal system in Houston that would distribute as much functionality as possible, steering it away from the carrier's centralized computing facility, Hultsman says.

For example, customer services such as baggage handling, boarding pass distribution, charge account handling and some gate assignment operations at Texas Air would be handled on Tandem Computers, Inc. systems at individual airport terminals.

The Tandem computers would use IBM's Systems Network Architecture protocols in order to communicate back to the data center's IBM host machines for basic operations, such

as flight coordination.

The fault-tolerant computers are one component of System One's drive for more reliable customer service, Hultsman says.

The company also plans to set up a fault-tolerant packet-switched network with redundant high-speed lines, which would ensure reliable communications among the firm's various carriers and data processing facilities.

Straying off reservation

The travel reservation service market is another focal point for carriers' strategic deployment of computer systems.

American and United, which pioneered such systems in the late 1970s, faced no serious challenge to their dominance until the last year or so.

What changed the market from a two-horse race into a free-for-all was the realization by all major carriers of how large a return reservation services offer, says Peter Zegan, a professor of MIS at Miami's Florida International University and a consultant for several airlines.

American, for example, reportedly receives \$1.70 for every transaction on its reservation system and gets about 20%

more business from agencies that use Sabre than from those that do not, Zegan says.

Given that travel agencies generate approximately 70% of all airline ticket sales, according to Zegan, it is not surprising that American and United's market share is being threatened by Texas Air, Delta and a partnership consisting of Transworld Airlines and Northwest (see chart above).

The combatants seek to gain and keep customers by enhancing their reservation systems to be more reliable and easy to use and by introducing turnkey systems that are designed to make travel agents' jobs easier.

A large portion of carriers' telecommunications outlays have gone into faster, more reliable pipelines to deliver their services to the various travel agencies.

System One recently installed a high-speed pipeline between Continental and Eastern data centers, enabling agents to make and confirm reservations without having to log off one system and on to another.

Most of the major competitors now offer to replace an agent's IBM 3270 terminal with a PS/2 workstation, which, in

Continued on page 50

Get them to the gates on time

BY HARVEY NEWQUIST

At United Airlines' terminals at Stapleton Airport in Denver and O'Hare Airport in Chicago, an expert system keeps hourly gate assignment chores in check.

According to Mark Teflian, vice-president of technical planning at United, "the GADS [Gate Assignment Decision System] provided immediate payback in efficiency of gate assignment

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

and aircraft zone control."

Currently, gate controllers at United's new O'Hare terminal assign more than 400 flights daily to one of 50 gates.

The assignments must take into consideration that planes like DC-10s and 747s do not maneuver easily into all available gates and that runway backups and weather affect how quickly individual flights can get in and out. Since United's reputation relies on servicing customers efficiently regardless of weather conditions and flight delays, timely gate management is a necessity.

GADS consists of Texas Instruments, Inc.'s Explorer LISP machine workstations and a knowledge base sup-

plied by half a dozen experts from United's gate operations team. According to United and TI officials, the system took 10 months to develop and, after two test phases, was installed in both airport terminals last July.

Before implementing GADS, airline employees relied on a huge magnetic board to keep track of gate positions and moved the airplane magnets according to flight plans, much like a war game table. The new expert system provides controllers with a graphic depiction of current gate status. Possible assignment scenarios can be manipulated on command.

More important, the system makes

routine assignments so that true experts can focus on more critical assignments. GADS is linked into United's proprietary flight information system, Unimatic. Unimatic now feeds flight information directly into GADS, which can then update its decision-making process based on the status of incoming and outgoing planes.

Because of the expert system's success, United is now planning on installing GADS in several other key airports.

"But equally important," Teflian says, "we're gaining firsthand experience with a technology that has the potential to improve numerous other hub management operations." •

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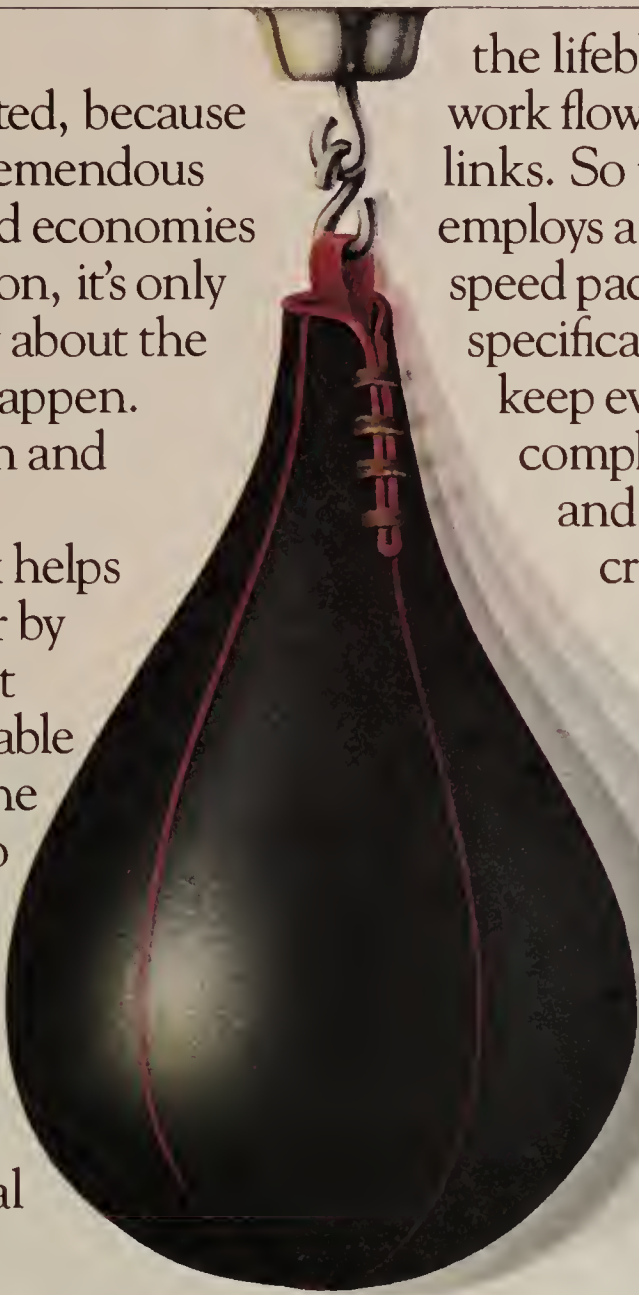
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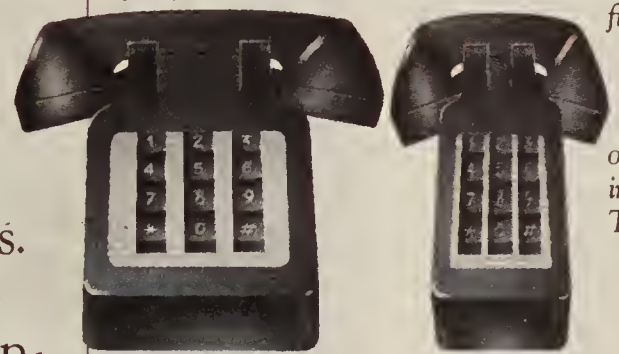
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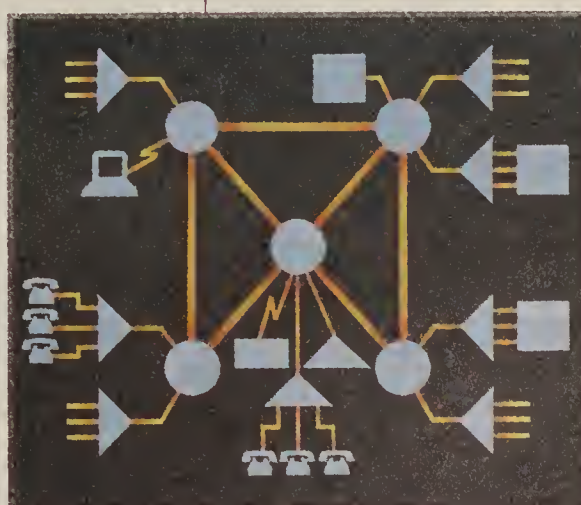
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The Networking Experts

Delayed traffic control system may (finally) get off the ground

BY BECKY BATCHA

After more than five years of confrontation between the Federal Aviation Administration and Congress, a computer system that will help control U.S. air traffic in the 21st century has finally been approved for production — almost.

Last December, the U.S. Congress granted sufficient funding to get the ball rolling on production of the FAA's \$5 billion Advanced Automation System (AAS). On July 29, if all goes as scheduled, either IBM's Federal Systems Division or Hughes Aircraft Co. will win the contract for the gigantic project and will begin building it.

The FAA still needs to convince Congress that its cost justifications for the AAS hold water

tributed Data Interface and the ISO Open Systems Interconnect model.

• **A new complement of computing power.** The FAA will

install a network of mainframes in its 20 regional air traffic control centers in 1995 or 1996, if production goes as planned. The specific system architecture will

depend on which contractor gets the bid, but the FAA considers modularity, reliability, ease of maintenance and ease of installation to be its general priorities.

Hardware reliability is especially critical, as the system cannot accumulate more than three seconds of downtime per year. A viable plan for crossing over from the current air traffic control network of IBM 3083 hosts

also ranks high on the list of requirements, Perie says. "You can't shut off the air traffic control system for a few months to cut the systems over."

• **Software for tracking and analyzing flight plan information and radar data on flight status.** The suite of real-time software that will monitor air traffic is known as Aera, for Automated En Route Air Traffic



Three out
of four
programming
hours are
wasted.

UN

HARDWARE is critical, as the system cannot accumulate more than three seconds of downtime per year.

and that the system's hardware and software components will work as planned. But disputes about the need for preproduction testing, which held up the project for months, seem to be settled for good.

The FAA has agreed to production models, and Congress is pleased with the outcome. "We are basically satisfied," says a spokesman from the House Appropriations Committee. "We are comfortable with the program schedule."

The AAS consists of four main components, slated to go into operation incrementally during the next decade:

• **New color workstations for air traffic controllers.** Workstations, the first component, are scheduled for implementation in 1993 or 1994, according to Michael Perie, manager of the FAA's AAS effort.

The workstations' primary advantage, Perie says, will be to combine radar tracking and flight plan monitoring.

• **A local-area networking scheme that links controller workstations to host mainframes.** Perie says the networks will be put in place at the same time as the workstations. IBM and Hughes suggest proprietary networking schemes based on the IEEE 802 protocol, the ANSI Fiber Dis-

Batcha is a free-lance writer based in Boston.

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Control. It will be written in the Ada language, which the FAA chose primarily for its high reliability in real-time applications and its ease of maintenance, Perie says.

Aera will come up in stages, starting with relatively straightforward flight monitoring and control functions set to go on-line with the new host mainframes in the mid-1990s.

Later phases of software development, planned to continue beyond the year 2000, will include programs that spot potentially dangerous situations and suggest preventive action and ones that approve or deny airlines' requests for preferred flight routes. Still other programs are designed to reduce the amount of work that air traffic controllers must handle.

Because the AAS contract is one of the government's largest civilian computer projects to date, because it is designed to use unproven hardware and software and because the current air traffic control system leaves so much to be desired, the FAA has been subject to intense scrutiny since it proposed the plan in 1981.

Congress's watchdog organi-

zation, the General Accounting Office's Information Management and Technology Division, or GAO/Imtec, put up a strong fight to have a prototype testing phase inserted between AAS design and AAS production phases. And it won.

But the division has not let the FAA off the hook yet. "The changes the FAA made are positive," GAO/Imtec evaluator Ted

Alves says. "There's an increased likelihood of success, but there are still major risks."

Good faith

Congress's move to grant money for the acquisition signals that the FAA has acted in good conscience to correct perceived deficiencies, the House committee spokesman says. Legislators are concerned, however, that cost increases and technical delays could hurt the project. The AAS is already 50% over its design budget and close to two years behind schedule, and that's for the planning stage alone.

Given the size and complexity of the effort, however, no one expects development to proceed without a few hitches. "I think it's inevitable that there are going to be problems with it before it goes operational," the House committee spokesman points out. "That is a long way off."

THERE are only so many airplanes that can go up and down off that concrete at any point in time."

MICHAEL PERIE
FEDERAL AVIATION
ADMINISTRATION

Until the AAS goes into production, the nation's air traffic control system will depend on 1960s-era workstations and software powered by the network of 3083 hosts that came on-line in the past year.

With the ability to handle 4.3 million instructions per second (MIPS), each 3083 mainframe has about twice the power it should need to monitor traffic volume projected for the mid-1990s, the FAA's Perie says. Should the AAS fall further behind schedule and traffic volume expand more than expected, a 24-hour field upgrade could increase performance to 6 MIPS.

Don't count your chickens

Still, neither the interim 3083 network nor the AAS itself can translate into guaranteed on-time flights for road-weary commuters.

Increased computer capacity and functionality can do little to counteract bad weather or relieve overcrowding at airports, the two main causes of delays and cancellations. "There are only so many airplanes that can go up and down off that concrete at any point in time," Perie says, no matter how good the computer system gets.

"If you want to think of the whole air traffic system as a series of bottlenecks, we've removed one bottleneck," he continues. "But there are more bottlenecks to go." •

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Carriers

CONTINUED FROM PAGE 74

addition to calling up reservation data on the airline's host, can practically perform travel agents' jobs for them.

American's Sabreworks, for example, provides word processing, data base and spreadsheet capabilities as well as a fill-in-the-blanks menu to guide inexperienced agents through the reservation making process.



Covia's
Pemberton

United's Focal point is said to provide both menus and an English-like command structure for agents intimidated by the complex code typically used to input reservations.

The up-front development and installation costs of such systems can be high. When American sued Delta and Texas Air recently for allegedly persuading agencies to break their five-year contracts with Sabre, one of its principal complaints was of having to write off the installation, training and amortized development costs of turncoat agencies' PS/2-based systems, AMR's Selman says.

Carriers harbor few doubts that the potential paybacks are well worth the up-front costs and risks, however. Delta's quick pickup of 91 agencies in less than six months after introducing Deltastar exemplifies the return of such systems.

The PS/2-based systems offer another potential return, according to United's Pemberton. By providing agents with local intelligence, the systems cut back on the amount of computing power and communications bandwidth that the carrier must allocate to agency services.

Under "the old dumb-terminal mode," he says, the carrier's mainframes kept overloading as use of its reservation service grew.

Travel reservation systems are only one of a growing number of products and facilities that carriers are reselling to other companies — both for profit and as a way of boosting market share.

Taking systems to market

Major carriers are starting to look at their DP centers as profitable in their own right, according to DMW Group's Maybaum. AMR, for example, includes a travel services group that sells, among other things, a turnkey reservation system to hotels.

Former United/Allegis Corp. Chairman Richard Ferris set up Covia approximately a year ago to support both in-house operations and planned expansion into the travel services business, Selman says.

For several years now, major carriers have resold internally developed software and excess computing resources.

"Just about everything developed for Continental or Eastern is being resold to other airlines; the Continental reserva-

"I T'S A small incremental cost to add another airline to your system."

PETER ZEGAN
FLORIDA INTERNATIONAL
UNIVERSITY

tion system does reservations for 35 to 40 other airlines," System One's Hultsman says.

"It's a small incremental cost to add another airline to your system," Florida International's Zegan says.

Demand for predeveloped maintenance, flight tracking, reservation and crew management computer systems is high among small airlines that cannot afford in-house software development costs — which are about the same for a small or large carrier, he adds.

The ability to recoup development or

MIS takes off

Three key areas in which airline information systems add to competitiveness

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Airline mergers providing broader MIS base

Travel reservations systems



American's Sabre
United's Apollo
Texas Air's System One
TWA and Northwest's PARS
Delta's Datas II

Sale of internal services



DP centers as profit centers
Marketing excess computing resources
Developing and marketing maintenance, flight tracking, reservations and crew management solutions for smaller airlines

CW CHART

installation costs through resale has allowed some carriers' DP subsidiaries to undertake ambitious projects that ultimately win the carrier a bigger piece of the market pie.

In January, for example, System One purchased 10,000 route miles of fiber-optic cable, which supports 45M-bit/sec. voice/data transmission, from Lightnet and Williams Telecommunications Group.

The network will serve at least three purposes. First, it will support faster and more reliable communications between various Texas Air subsidiaries and internal operations, according to Hultsman.

Second, it will bring in profit: System

One has become a telecommunications carrier with the right to sell voice/data transmission services to other businesses. And third, the network's "virtually unlimited bandwidth," coupled with major upgrades in distributed computing power, will give System One the leverage to quickly develop new applications and products that will "differentiate us from other carriers in a marketplace that is changing at the speed of light," Hultsman says.

He adds, "I agree with people who have been saying that deregulation would have been impossible without the technology to support it." •

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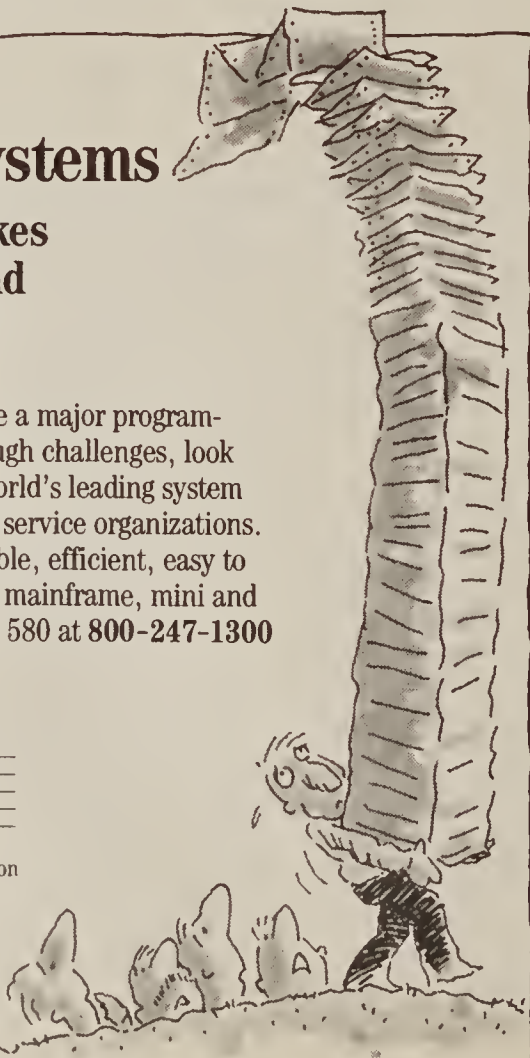
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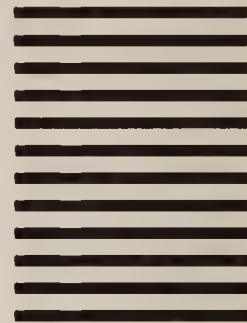
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IN DEPTH

IBM PC orphans hang on to a good thing

If you resist switching to the PS/2 — for whatever reason — here are your alternatives

BY ALAN RADDING

It's not that there are straggling columns of IBM PC refugees searching for a safe haven now that IBM has abandoned the DOS standard for the Personal System/2. But large corporate users — even those who have announced their intentions to shift to the new standard — are not junking their IBM Personal Computer investment, either.

When the last PC AT shipped in December, it marked the end of a lively five-year era for IBM, in which the firm rose to the forefront of new markets. But that era is apparently not yet over for most users, large or small.

Instead, according to a fourth-quarter 1987 survey conducted by International Data Corp. (IDC) in Framingham, Mass., more than 60% of large organizations are buying personal computers based primarily on the requirements of their end users — not on the latest technology available.

And most ranked OS/2, the operating system IBM and Microsoft Corp. are developing for the PS/2, near the bottom of their list of desired upgrades.

Someday a PS/2

Of the 200 companies surveyed, 73% indicated they planned to purchase some PS/2s this year, but only 12% said they will buy PS/2s exclusively.

And the secondhand market is flourishing. Alex Randall, president of the Boston-based Bos-

ton Computer Exchange Corp., which brokers used computers worldwide, reports that the IBM PC XT has actually increased in price since the announcement of the new IBM line. In January 1987, a used XT in good condition sold for \$1,750. A year later, a similar machine sells for \$1,825.

PS/2 technology presents a

dilemma for many companies, like Chicago-based Heller Financial, Inc. Charles Mallet, senior vice-president of information management services, says his shop will eventually make a complete conversion to the new technology — “at some point.”

Heller already has an OS/2 pilot program under way and a task force studying the issue.

But Mallet's operation relies on an installed base of more than 500 IBM PCs. His problem lies in when to make the jump and, more immediately, what to do now, since the organization needs new machines.

“How do you service your clients when there are two different operating systems?” he asks. If nothing else, he says, dealing



BART GOLDMAN

Radding is a Boston-based author specializing in business and technology.

- **Installed base of DOS PCs still growing**
- **Some prefer old standard, even for LANs**
- **Stand-alone applications? Sit tight**

with two storage media of different sizes — 5¼-in. floppies and 3½-in. diskettes — creates an awkward situation.

In the meantime, along with the pilot OS/2 program, Heller just bought more than \$300,000 worth of Compaq Computer Corp. machines that adhere to the old PC standard.

Waiting for Godot

Lee Doyle, manager of PC services at IDC, published a series of reports on customer reactions to the PS/2, beginning last summer. He suggests that Mallet's experience is typical of what has been going on

throughout corporate America.

Initial reports of customers' anger at IBM for abandoning the PC standard in favor of the PS/2 have given way lately to not anger or resentment but confusion, Doyle says — or resignation. Thus Mallet's dual strategy is not uncommon.

Plenty of customers realize the limitations of DOS and are in full agreement with the IBM strategy, he adds. But most of them are taking a wait-and-see attitude.

In general, professionals who consult corporate users are suggesting that companies not upgrade until applications and capabilities exist that the

organization wants and that also require the new hardware and operating system.

Since most PCs today are used for stand-alone, character-based applications such as word processing, spreadsheets and simple data bases, consultants are almost unanimous in their recommendation to sit tight with the DOS machine.

"There is so little written for OS/2. . . . Those who are buying it are buying to experiment," says Stephen DelVecchio, manager of the microcomputer advisory group at Coopers & Lybrand in Boston. "For most people, the PC standard is just fine."

From a financial standpoint, waiting makes the most sense, as long as productivity is not suffering. "Why buy now if you don't really need it? In this industry, prices always come down," says Marc Sokol, executive vice-president of Realia, Inc. in Chicago.

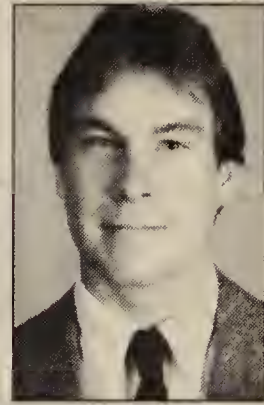
What will change is the nature of the end user. "You won't see computer people using the [old] machines. These will be people who aren't worried about state-of-the-art," says Steve Veto, publisher of *PC Resources*, a

Peterborough, N.H.-based magazine devoted to supporting IBM PCs and compatibles.

"Old PCs don't die," adds Tom Daven-



Heller's Mallet



IDC's Doyle

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SINCE most PCs today are used for stand-alone, character-based applications, consultants are almost unanimous in their recommendations to sit tight with the DOS machine.

port, director of research at the Index Group, Inc. in Cambridge, Mass. Instead, they are passed down the corporate ladder and put to use for clerical tasks, he says. Even an old PC with two floppies still makes a terrific word processor.

Comfort in numbers

What gives IBM PC users confidence to continue with the old standard despite IBM's departure from it? The huge installed base of PCs and compatibles. According to figures compiled by IDC, there are approximately 18 million IBM PCs and compatibles worldwide.

Ironically, the number of DOS PCs and compatibles in the field will actually increase despite the departure of IBM. According to some predictions, PC prices — already less than \$1,000 for basic models — will continue to drop.

Existing machines will keep circulating, and more DOS machines based on Intel Corp. 80286- and 80386-based technology will be put into circulation. The net result will be a larger installed base than currently exists.

Furthermore, the DOS faithful have not been left at a dead end; in fact, this may be the best thing going for them. There is a clear upgrade path for PC users who may someday want to take advantage of OS/2. The new operating system will be able to run on many 286- and 386-based machines.

"If you are buying a 286 machine today," Realia's Sokol says, "you really are facing a binary test: Does it boot OS/2?" The answer will be a clear yes or no, giving buyers a simple criterion if they are planning to upgrade their existing machines.

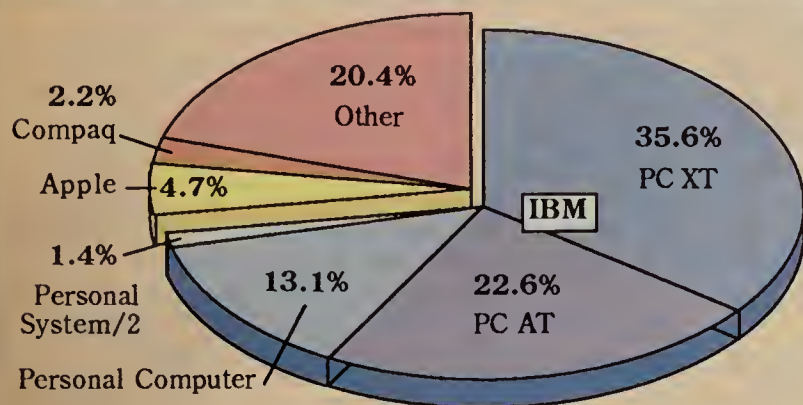
Not high and dry

Users have some attractive options to choose from. One is to trade up gradually to 286- and 386-based DOS machines that can accept OS/2 when there is a reason to make the leap but that, in the meantime, are able to run DOS applications better than ever before.

Another option is expansion through

IBM's PC of the rock

IBM clearly leads in personal computer market share at Fortune 1,000 sites, as of November 1987



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.

networks. Since DOS workstations can connect very easily to an OS/2 server in a network, there is no reason to be concerned about being left high and dry, says Howard Elias, senior director of computer merchandising at the Radio Shack division of Tandy Corp. in Fort Worth, Texas.

Another strategy is to put 286- and 386-based accelerator boards into older PCs. This option supplies speed and extra memory for larger DOS applications that you may want to run now and which the smaller machine cannot handle.

Exception to the rule

IDC, which as a general policy cautions against the use of accelerator cards, makes an exception in this case.

"The specter of OS/2 and the large [cost] overhead it will bring to the market may open up the need for accelerator cards and boards," Doyle says.

IDC's usual reservations have to do with reliability and cost effectiveness of accelerator boards. But Doyle says he is favorably impressed with the Intel products in this area. And while he says add-in cards are still not

an inexpensive solution, certainly adding one costs less than buying a PS/2.

The boards represent roughly a \$2,000 investment, plus the cost of added memory, vs. a \$5,000 to \$7,000 investment for a new machine.

One micro manager in Virginia says he is very excited about the Intel 386 board and swears that if he "could get 100 of them tomorrow," he'd grab them.

The ultimate strategy, of course, is to do nothing for now, as long as you are not already bumping into the limitations of your current machines.

The real limitation, it turns out, may not be the older machines but rather the applications themselves and users' abilities to conceptualize beyond the software they already use.

"Most companies lack a model for personal computing other than spreadsheets and word processing. For that, they don't need PS/2," the Index Group's Davenport says.

Eventually, he says, "we'll figure out the 1990s' equivalent to the spreadsheet," and then you'll know it is time to make the change.

The power users in your company may push for the new technology right away. Users who run applications that require advanced graphics or those who are lured by the promise of connectivity and multitasking will be the most eager to make the transition, says David Browning, a partner at WBS & Associates, an Annandale, Va., microcomputer consulting firm.

Steered to PCs

But even when connectivity is the issue, some consultants still prefer PCs over the new technology. For many networking applications, the PC is perfectly adequate.

Speed is not really a function of the CPU when you are talking about networks, Browning says. The file server and network design influence the speed of the network more than the CPU, he points out.

As a result, Browning says, he recently installed a network of 100 PC clones, Intel 8088 machines with a turbo board. Not only did he advise against going to the PS/2 line, but he steered his client away from the substantially more expensive 286- and 386-based machines.

The result is an effective local-area network priced at a fraction of what the new technology would have cost.

Of course, there are strong financial incentives to stick with what you have. Even though many corporate machines have fully depreciated, chief financial officers may not readily allow their companies to walk away from their PC investment.

"It will take persuasive arguments to convince [CFOs] to throw away the PCs for new machines," the Index Group's Davenport says.

In 1984, the Index Group began researching the idea of disposing of PCs as part of the product life cycle, but the research did not yield much data. "Nobody believed it would happen," Davenport says.

Playing it safe

What if your PCs are not actually assets? Does that make the transition any easier?

Well, leasing firms are not seeing a major migration to the new technology either, even though it could be expected that firms that lease their machines would be the first to trade up.

"Customers aren't upgrading to the new machines," says Paul Ranelli, vice-president of finance

Continued on next page



Index Group's Davenport

Why not?

Once customers begin to ponder alternatives to the original IBM Personal Computer and seriously consider making changes, there is no telling where it will lead them.

A corporate customer service manager for a utilities system for Ashton-Tate Corp.'s Dbase has noticed a sudden interest in the Apple Computer, Inc. Macintosh in shops that had been staunchly IBM.

The sentiment the manager is picking up on is that if the companies are going to change, then why not experiment a little bit.

Tom Davenport, director of research at the Index Group, Inc. in Cambridge, Mass., says he has also noticed a few companies suddenly looking at the Macintosh, a machine they wouldn't have even considered a few months ago.

Macintosh supporters in the corporate world, who have been battling the entrenched single-standard mentality, have a new argument, he explains.

Their position is, Now that the single standard has been breached, if you can accept two standards, why not three?

ALAN RADDING

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New York City	1/27, 2/24, 3/22
Norfolk, VA	3/15
Oklahoma City	2/23
Orange County, CA	2/4, 3/15
Philadelphia	2/4
Phoenix	3/1
Pittsburgh	2/2
Portland	1/27
Raleigh, NC	2/2
Rochester, NY	1/28, 3/16
Sacramento	2/2
Salt Lake City	1/27
San Diego	2/23
San Francisco	2/3, 3/16
San Jose	2/23
Seattle	1/26, 3/10
St. Louis	2/25
Tampa	3/24
Uniondale, NY	3/2
Washington, D.C.	1/26, 2/23, 3/22

Canada

Montreal	1/19
Ottawa	1/21
Toronto	2/4, 3/24
Vancouver	2/18

International

Bonn	2/24
Frankfurt	3/31
London	2/12, 3/10
Munich	1/27
Paris	2/25



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The party's not over — yet

IBM has left its own party, but the DOS merry-making will continue — at least for a while longer, depending on who you talk to.

Industry observers say OS/2 and the Personal System/2 will come into their own within the next three years in large corporate environments, in which connectivity and multitasking are paramount. But stand-alone PC users can be confident that their machines will maintain a high level of support for at least another five years.

Compaq Computer Corp. has already picked up IBM's banner, providing the leading Microsoft Corp.

MS-DOS machine in the corporate environment. The company says it is committed to straddling the same two technologies users are trying to straddle, although it still produces only one Intel Corp. 8086-based machine. "All our [Intel] 286 and 386 machines will run OS/2," says Lynn Parsons, a Compaq spokesman.

At the same time, he says, "we will continue to support our products with DOS enhancements." Naturally, customers must judge for themselves how long this support will last.

Tandy Corp. is benefiting from IBM's sudden departure from the DOS world as well. "For the first

time, we have large accounts calling us," says Howard Elias, senior director of computer merchandising for the Radio Shack division of Tandy in Fort Worth, Texas. But, Elias says, "the business world is moving to new platforms, OS/2 and beyond." Tandy's strategy is to "sell platforms that will migrate," he continues. Radio Shack will concentrate on 286- and 386-based machines that, Elias says, will be able to run OS/2.

"We don't see an end to DOS," Elias says. His reasoning is the huge installed base. "DOS has the momentum. You can't turn it off if you wanted to."

ALAN RADDING

"Our order processing must be more competitive."



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Orphans

FROM PRECEDING PAGE

at Selecterm, a computer leasing firm in Danvers, Mass. Instead, they are playing it safe and staying with the technology they know, Ranelli says.

He also reports a strong secondary market for PC XT's, clearly obsolete machines that should be plunging in value but are holding their own.

When IBM announced it was dropping the PC in favor of the PS/2, knowledgeable people advised Mike Rohrbach to dump his large inventory of rental IBM

NEW technologies may force corporations to redefine their notions of personal computing.

PCs. Rohrbach is vice-president of Boston-based International Market Resources, a computer rental firm.

But he didn't follow that advice. Instead, the company decided to bring in more PC compatibles because it believes the PC market will be around for a long time. Rohrbach says the PS/2 and OS/2 platforms are clearly directed toward the largest corporate users. "We looked at small to medium-size companies, and they were going to stay with PCs," he says. Eventually his company will buy PS/2 machines, he realizes, but "we haven't had very many calls for them," he says.

A changing world

By 1990, however, the PC era may really begin to taper off. Most major manufacturers are expected to stop making the oldest 8086- and 8088-based machines by then, even in the laptop segment, in which 8088 technology is still prevalent, Davenport predicts.

For now, the choices customers face are both awkward and far-reaching. More than just presenting a costly purchasing decision, the technologies that are emerging may force corporations to redefine their notions of personal computing. In particular, mainframe models will increasingly penetrate the personal computing environment.

For the next few years at least, corporations are going to suffer through multiple technology standards and different visions of what computing is all about. Without the dominant DOS standard, Realia's Sokol says, "the world has suddenly gotten more complicated." •

TAKING CHARGE

William R. Duncan

Projects from the ground up

An architect would not attempt to prepare a financial statement, and few accountants would attempt to design a building. Although both are professionals, the skills and experience necessary to practice in each field are quite different. Fortunately, both the consumers and the providers of these services recognize the differences.

Software development and project management are also professions. The skills and experiences necessary to practice in each field are quite different. The software professional must have a detailed understanding of the technology involved in creating the end product: how the hardware, software and end user will interact.

The project management professional must have a detailed understanding of the process involved: how to estimate, schedule and measure progress. In addition, both must be equally capable of dealing with people to help manage and motivate the project team.

Professional differences

Unfortunately, neither the users nor the providers of software have yet recognized the differences between the professions. Software projects continue to be managed by software professionals who emphasize technology and people to the detriment of process. But a successful

Continued on page 90

Travelers' Brophy on developing vision

BY STANLEY GIBSON
CW STAFF

Leaving work late one Friday a couple of years ago, Paul Barrett, vice-president of employee benefits systems at The Travelers Corp. in Hartford, Conn., went out to the company garage and found he had locked himself out of his car. He needed to get to a locksmith, so he sought help from someone still at work. At 7 p.m., the only one left was his boss, Joseph Brophy, who came out to help him.

As they drove to the locksmith in Brophy's car, Barrett heard a strange sound coming from the cassette player. Brophy was listening to a tape of conversational Chinese, although he admitted he could not understand a word.

Brophy's idea was, in preparation for an upcoming trip to China, to begin studying the Chinese language by immersing himself in its sounds.

Listening is important to Brophy, the senior vice-president and chief of Information Systems at The Travelers. Listening, he says, has been a key to planning for the firm's mushrooming capacity needs and developing its corporatewide transaction processing and communications network.

Through the years, Brophy has listened carefully to those who report to him and has paid close attention to demographic and technological trends in his drive to put The Travelers at the leading edge of computer technology.

Travers Waltrip, telecom-

PROFILE

Joseph Brophy



Position: Senior vice-president, The Travelers Corp.

Mission: Promoting a vision of how information technology can be used to make money and improve the organization.

munications manager and one of six people who report directly to Brophy, puts it this way: "We operate as a team. There is a lot of discussion among ourselves. Very seldom does he make an edict. But he listens carefully so that he can make one if it is required."

Brophy also likes to be heard. He is the No. 1 user of voice mail at The Travelers and is wont to leave messages on it at all hours, according to Barrett. He is also a serious bagpipe player.

Brophy's wide-ranging interests take him out of the realm of the techie — even out of the realm of the mainstream manag-

Continued on page 89

MANAGEMENT TOOLS

MIS managers catch up with technology

BY ROSE MULA
SPECIAL TO CW

Like cobblers with holes in their shoes, MIS managers have long provided sophisticated data processing services to others but have often undertaken their own management tasks with antiquated manual systems.

That anomaly is fast being corrected, however, as a new breed of management software enters the scene. And early reviews show systems managers giving these automated administration tools a cautious thumbs-up.

MIS can't count on software to solve all its management problems, warns Arnie Roberts, a consultant with ADC Associates, Inc. in Palo Alto, Calif. But he says there are a number of excellent programs that can help. That's the good news.

The bad news, Roberts says, is that some MIS professionals think if they buy a good project management system, it will automatically make them good managers. "Not true," he stresses. "You must understand the elements of project management before any program can help you."

Assets management

One of the biggest projects MIS faces is coordinating its assets. MIS pros at Equitable

Bank NA in Baltimore have turned to The Equipment and Software System (TESS) for help. TESS is a mainframe-based tool for managing DP assets and procedures that was developed and is currently sold by Bendata Management Systems, Inc. in Dallas. However, Morino Associates, Inc. in Vienna, Va., reportedly will



ANNIE GUSSMAN

acquire full rights to TESS by June.

Phillip Miller, a systems programmer at Equitable, says the bank has been using TESS for about 2½ years to control its hardware and software inventory not only at its headquarters location but also at approximately 125 branches in Maryland, Delaware and Washington, D.C.

An authorized user can access TESS at any time to de-

Continued on page 88

Decentralized DP sites seen lacking in recovery planning

BY DAVID A. LUDLUM
CW STAFF

Contingency planning has often failed to keep up with the decentralization of data processing, according to a recent report.

The lack of planning jeopardizes decentralized functions such as order entry, accounts receivable, inventory tracking and office automation, according to the report by the The Diebold Research Program, an arm of The Diebold Group, Inc. consulting firm supported by 200 sponsors.

Perhaps one or two of the Fortune 100 companies have

contingency plans for decentralized systems, although the number is growing as the systems handle more important functions, said Raymond Epich, a Diebold vice-president and manager of the firm's Chicago office.

"Even among very large, sophisticated companies, it's a process they're just starting to get involved with," Epich said. According to Epich, when floods hit Chicago last fall, at least four companies' office systems were damaged.

Diebold cites several reasons for the lack of planning at decentralized sites, including small staffs lacking DP operations ex-

pertise and facing a pressing backlog of applications to develop, the reluctance of corporate managers to impose requirements, limited budgets and the belief that plans will be as expensive as those for central sites.

Unconventional threats

Jerry Isaacson, a Northboro, Mass., computer security consultant, agreed with the report and added that decentralized sites face some unconventional threats, such as theft of the processor. "It's not too hard to walk off with a Microvax with all the corporate data on it," he said.

When organizations decen-

tralize, users sometimes neglect contingency planning because it had been transparent to them, Isaacson said.

Jack Bannan, president of the Delaware Valley Disaster Recovery Information Exchange Group, said decentralized sites are not likely to need contingency planning if data is exchanged with a central mainframe.

"It depends on whether critical applications are run solely on the minis. If the data is downloaded and uploaded, the destruction of a mini isn't going to put anyone out of business. You have to look at each thing on its own merit," Bannan said.

Appropriate planning for a distributed processor depends on the applications it runs, according to James Levinger, a spokesman for Wang Laboratories, Inc.'s Wang VS Backup and Recovery Services. "It's what you've got to do with it in a contingency situation," he said. "What's right for a mainframe might be drastic overkill at this level."

Managers of decentralized sites need guidance from upper management in developing plans, Epich said. "Unless someone's putting it together for them in the larger context, they don't understand the significance. There's got to be someone whose calling the tune from a central location."

The Jury-Rigged Network.

Up until it broke down, it wasn't a bad network. However, the jury is still out on who's responsible for fixing it.

This isn't a fairy tale, but it could easily start off "Once Upon A Time . . ."

The main characters are professionals like yourself, faced with the complex task of evaluating and implementing network strategies in the face of constantly shifting carrier regulations and options, rapidly changing technology, and a rising chorus of vendor claims and promises that hold more smoke than substance. Just like a fairy tale, you have to travel through this fantasy-filled world in order to safely arrive at a happy ending. The danger is, you could very well end up with something we call the "Jury-Rigged Network".

And it won't resemble a happy ending.

The Jury-Rigged Network And How To Avoid It.

In simple terms, a Jury-Rigged Network is one that was never designed or implemented within a *total* systems perspective. The individual components, too often a mix-and-match assortment, are forced to perform at degraded levels to achieve *ad hoc* compatibility. In effect, the whole network becomes less than the sum of its parts, with the end user left to discover—as he certainly will—the weak links built into his network by a vendor who never really held more than a few pieces to the puzzle. A vendor who may not be around when the puzzle comes apart.

Therefore, the key to managing risk in the development of your network lies with selecting the right vendor. A vendor more interested in developing a long-term strategy for your success than selling his off-the-shelf products. Choose wisely and you're no longer talking about a vendor.

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How To Choose The Right Partner.

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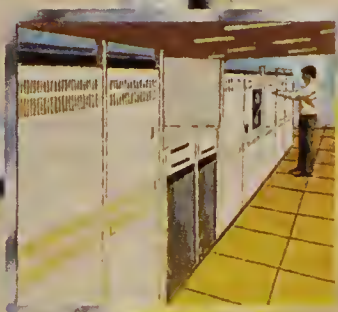
we've been able to develop truly superior products, and build in network integrity from the smallest system to the largest. We've also been able to deliver end user benefits no other company can offer: backward and forward compatibility in all our network equipment; products that achieve an MTBF 50–200% higher than our leading competitors; and a third generation network management system that's more reliable and easier to maintain and upgrade.

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"We can design, build, stage, test, install, manage, service and upgrade your network and never lift the phone to dial a third-party vendor."





you to take full advantage of AT&T's current and future service offerings without sacrificing many of the benefits associated with private networking—all under the control of a single network management system.

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What all this boils down to, is a network

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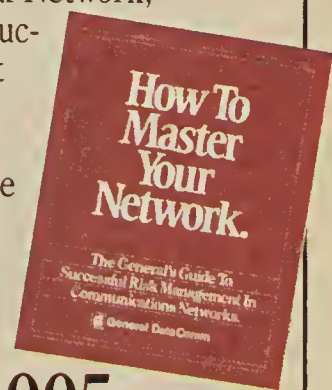
whose integrity you can depend on. A network, in fact, totally unlike anything any other single company could possibly create for you. Even by jury-rigging.

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Catching up

FROM PAGE 85

termine the location and status of any hardware or software item at the company, such as when and from whom the item was purchased or leased, how many months it has depreciated, when invoice payments are due, when a piece of equipment is scheduled for maintenance and if that maintenance is covered by agreement.

Miller says TESS has saved the bank thousands of dollars by flagging maintenance agreement payments being made on items the company no longer had. And because TESS is SAS-based, it also lends itself well to ad hoc reporting, Miller says.

Campbell Soup Co. in Camden, N.J., "you can have only one person updating on-line at a time."

Campbell used TESS to track its corporate equipment worldwide. However, the company had no direct links to allow remote facilities with no mainframes to input data. Fortunately, Bendata Management developed Computer Assets Tracking System (CATS), a personal computer-based system that enables all of Campbell's 25 remote facilities to link into the network.

CATS "will help us make decisions about future acquisitions and replacements and possibly swapping assets from one location to another," MacKenzie says. He says the information may also affect the company's volume purchase agreements.



Dataproducts'
William Strowbridge

\$995; the local-area network version costs \$2,900.

Another automated management product — Sofstore from Hanover, N.H.-based DTSS, Inc. — focuses on the electronic

ing control and to generate a variety of reports by accessing the stored data.

Dan Cavanagh, senior vice-president of information technology for Metropolitan Life Insurance Co. in New York, is an early Sofstore beta tester. "It really simplifies our distribution of new versions of PC software," Cavanagh says. "We merely install it in our mainframe, and all authorized employees can dial in and get their copies . . . it's very cost-effective."

In addition, Sofstore helps keep Metropolitan honest, Cavanagh says, by automatically restricting distribution of new releases to those employees who are licensed to receive them.

Scheduled to be available late this month, Sofstore will range in price from \$37,000 to \$116,000, depending on the host mainframe and the number of PCs connected. It runs under IBM's VM/CMS operating system using IBM's SQL/DS data base.

Report preparation

Microman II is an MIS automation tool developed by Poc-It Management Services, Inc. in Santa Monica, Calif. The product schedules and tracks projects for project managers and aids MIS directors in preparing management reports.

William Strowbridge, vice-president of management information resources at Dataproducts Corp. in Woodland Hills, Calif., says he uses PC-based Microman II for two reasons: one, because of its simplicity of operation compared with project management systems that are more network-oriented; and two, because it's the only program he has used that provides management reports in a format similar to what users are used to seeing.

"The reporting packages are not specifically in data processing terms," Strowbridge explains. "Microman II does an outstanding job reporting in terms of resource utilization, resource planning requirements and backlog of requests."

Strowbridge says his company, a manufacturer of computer

printers, has used Microman II to develop and implement an accounts receivable system and an order-entry system as well as for every-day problem resolution. Microman II runs on IBM PCs or compatibles and costs \$2,895.

Automated planning

For long-range planning automation, Lawrence Wergin used a product called Winplan during an 18-month stint as senior vice-president of the Data Center Division of Farm Credit Services in Wichita, Kan. He says Farm Credit's board of directors want-



Metropolitan Life's
Dan Cavanagh

ed to consolidate three separate DP departments and standardize all processing on a single computer family. Outside consultants estimated it would take more than \$26 million and five years to accomplish the goal. "With the help of Winplan," Wergin says, "we did it in less than two years and for less than \$11 million."

"The primary value of the package was to work as a communications vehicle between MIS management and senior management," Wergin explains.

Although long-term strategic planning was the original thrust of Winplan, enhancements in progress are aimed at adding short-term project planning to its capabilities. Winplan is available for \$495 from Windleaf, Inc. in Colorado Springs. It runs on IBM PCs and Digital Equipment Corp.'s Rainbow.

Mula is a Waltham, Mass.-based freelance writer.

More shoes for the cobbler

Other products that help MIS automate its management tasks include the following:

- Training Management, Administration, Planning and Scheduling Software (T-MAPSS) from Applied Learning International, Inc. in Naperville, Ill., is a data base training management system designed to deal with frequent changes in personnel, requirements and equipment. T-MAPSS is an integrated program that provides a foundation for the management of training and a way to correlate plans, accountabilities and costs into the overall business strategy. It runs on IBM Personal Computers and compatibles and costs \$4,950.
- PC Tracker from RG Software Systems, Inc. in Willow Grove, Pa., is a personal computer-

based inventory management system for tracking PCs, software, peripherals and accessories. PC Tracker systems can track up to 32,000 items, depending on the size of disk storage space available. The base price is \$495.

- The Micro Resource Manager from Atrium Information Group, Inc. in Fairfield, Iowa, is micro management software that compiles basic data on inventory, cost, training and support. The PC-based product builds a data base from which reports and chargeback analyses can be extracted. The basic cost ranges from \$995 to \$4,995. The local-area network version starts at \$5,695, and a Digital Equipment Corp. VAX version, due out in June, reportedly will cost from \$5,000 to \$20,000.

ROSE MULA

One criticism is that it takes more than 30 seconds to sign on to the system. That drawback is set to be corrected by Morino Associates. The current base price for TESS is \$23,000. It runs under IBM OS/VS, MVS or VM/CMS operating systems.

Eventually, Morino Associates plans to develop TESS into a multiple-user system, which MIS says it needs. "Right now," says Claude MacKenzie, director of computer operations and systems technology at

"If we see lots of old equipment out there, we might find that a volume discount might make it feasible to replace a lot of it at once, instead of making sporadic replacements here and there."

One flaw with CATS, MacKenzie says, is its lack of ad hoc reporting capabilities — a correction that Bendata plans to make. After that, "our remote locations can create reports, put them on a disk and send them to us. That will be a big plus." A single-user version of CATS costs

distribution and administration of PC software in firms at which the distributed computing asset base has become large but has gone unmanaged.

As its name implies, Sofstore functions as a software store. Employees can shop for, order and take delivery of software electronically from their IBM Personal Computer or compatible. And because the Sofstore data base resides on the host mainframe, it enables managers to exert more effective purchas-

C A L E N D A R

MARCH 13-19

1988 International Development Center Institute Conference. Orlando, Fla., March 13-16 — Contact: Development Center Institute, P.O. Box 44087, Indianapolis, Ind. 46244.

6th Annual National Conference on Ada Technology. Washington, D.C., March 14-17 — Contact: U.S. Army Communications-Electronics Command, ATTN: AMSEL-RD-LC-ASST-1A (Al Rodriguez), Fort Monmouth, N.J. 07703.

Securicam 88 — The 6th Worldwide Congress on Computer and Communications Security and Protection. Paris, March 15-17 — Contact: Securicom, 8 Rue de la Michodiere, 75002 Paris, France.

Desktop Presentations: Computers Reach for New Media. San Jose, Calif., March 16-18 — Contact: Jean O'Toole, CAP International, Inc., One Snow Road, Marshfield, Mass. 02050.

National Computer Graphics Association Ninth Annual Conference and Exposition (NCGA '88). Anaheim, Calif., March 20-24 — Contact: Sharon Sutton, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

MARCH 20-26

1988 Annual Conference of the National Automated Clearing House Association Conference (NACHA '88). Dallas, March 20-23 — Contact: Barb Hill,

Suite 640, 1901 L St. NW, Washington, D.C. 20036.

Compstan '88 Computer Standards Conference. Washington, D.C., March 21-23 — Contact: Computer Standards Conference, c/o Computer Society of the IEEE, 1730 Massachusetts Ave. NW, Washington, D.C. 20036.

10th Conference on Computers and Industrial Engineering. Dallas, March 23-25. Contact — Institute of Industrial Engineers, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

MARCH 27-APRIL 2

International Congress on CIM Data-bases '88. Cambridge, Mass., March 27-29 — Contact: Kim Takita, CAD/CIM Alert, 824 Boylston St., Chestnut Hill, Mass. 02167.

ISSA '88. San Francisco, March 27-30 —

Contact: Information Systems Security Association, P.O. Box 10246, Newport Beach, Calif. 92658.

The Candle Performance Conference. San Francisco, March 27-April 1 — Contact: Candle Education Registration Office, 1999 Bunday Drive, Los Angeles, Calif. 90025.

Interface '88. Chicago, March 28-31 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

1st Annual World Congress on Computing (WCC). Chicago, March 28-31 — Contact: The Interface Group, Inc., Registration Dept., 300 First Ave., Needham, Mass. 02194.

APRIL 2-9

AUUA, Inc. (Unysis users) Spring Conference. San Diego, April 5-8 — Contact: Randal L. Leonard, Gay & Taylor, Inc., P.O.

Box 1410, Winston-Salem, N.C. 27102.

PIMA Management Information Systems Conference. Savannah, Ga., April 6-8 — Contact: Scott Baumrueck, Paper Industry Management Association, 2400 East Oakton St., Arlington Heights, Ill. 60005.

1988 EFTA Expo. Washington, D.C., April 10-13 — Contact: Jim Callan, Electronic Funds Transfer Association, Suite 1000, 1726 M St. NW, Washington, D.C. 20036.

22nd Annual ATA National Workshop and Computer Systems Demonstrations. Baltimore, April 10-13 — Contact: American Trucking Association Management Systems Department, 2200 Mill Road, Alexandria, Va. 22314.

18th Conference on Computer Audit, Control and Security. Atlanta, April 10-15 — Contact: EDP Auditors Foundation, P.O. Box 88180, Carol Stream, Ill. 60188.

Brophy

CONTINUED FROM PAGE 85

er — and put him into the sphere of the humanist and philosopher.

In addition to mathematics, he studied philosophy in college and pursues his interest in the subject by reading the contemporary French philosopher Teilhard de Chardin.

"You have to have a vision. It requires a lot of work, a lot of reading, a lot of listening," Brophy says.

Community service

The philosophical leanings of 54-year-old Brophy do not confine his love for his fellow man to the abstract. He and his wife Carole Anne, parents of five children, are active in community groups such as the West Hartford Street Ministry, an ecumenical youth counseling organization.

"He is a blend of someone who can think systematically and someone who is compassionate," says Rick Lanz, director of the Street Ministry.

YOU HAVE to have a vision. It requires a lot of work, a lot of reading, a lot of listening."

JOSEPH BROPHY
THE TRAVELERS CORP.

For the past two years, Brophy has organized an annual concert of Celtic music for the benefit of the ministry. The bagpipe group in which he plays, St. Patrick's Pipe Band, has been featured along with other performers. "The Celtic music concert was his idea. He organized it. He also did publicity for it. We just stood by and watched," Lanz says.

Lanz reports that Brophy has helped him and the ministry in other ways, such as helping to design a pension plan for its employees. Lanz recounts that Brophy helped a young man who had dropped out of high school but was skilled in the use of computers to get a job at The Travelers.

DP just part of the big picture

In one sense, Brophy's broad interests are an end in themselves, helping to take his mind away from the mundane. But those interests also allow him to view the wide scope of life, of which data processing is just one part.

Once his vision of the future of DP is clear, it must be communicated. "A very significant part of my job is selling. What I have to sell is a vision of how technology can be used to improve the organization and contribute to the bottom line," Brophy says.

In 1976, when he was an IBM account executive dealing with The Travelers, Barrett recalls listening to a Brophy presentation on corporate networking and computing goals for 1981. It was extremely ambitious, Barrett thought, as he noted each goal for future reference. But five years later, the subject of Brophy's talk, a nationwide claims system called The Travelers' On-Line Processing System, was a reality.

Brophy's accomplishments have been widely recognized by colleagues. In 1986, he received the Data Processing Management Association's Distinguished Information Sciences Award. Several years

earlier, he received a citation from the state of Connecticut for his work in DP.

A New York native, Brophy went to parochial school there and graduated from Fordham University. He later pursued graduate studies at New York University.

His musical training began early, with five years of violin lessons. Later, with earnings from a part-time job, he bought a set of bagpipes and took lessons from an accomplished Scottish piper.

During the Korean War, Brophy took his bagpipes with him to Hokkaido, Japan, where he served in a skiing unit. He still enjoys cross-country skiing.

Brophy also studied French for many years and continues to read in the language. He revives his conversational

skills when European travels take him through France, he says.

After university studies, Brophy joined The Prudential Insurance Company of America in its actuarial training program, where he learned to program an IBM 650 computer. Later, he went into underwriting, billing and, finally, because of his interest and experience in data processing, MIS.

Traveling up the ladder

After a stint at an actuarial and consulting firm, he went to Bankers National Life Insurance Co., where he worked as chief actuary and later chief of data processing. In 1971, he moved to The Travelers.

Offering advice to young people launching a career in MIS, Brophy stress-

es the importance of education.

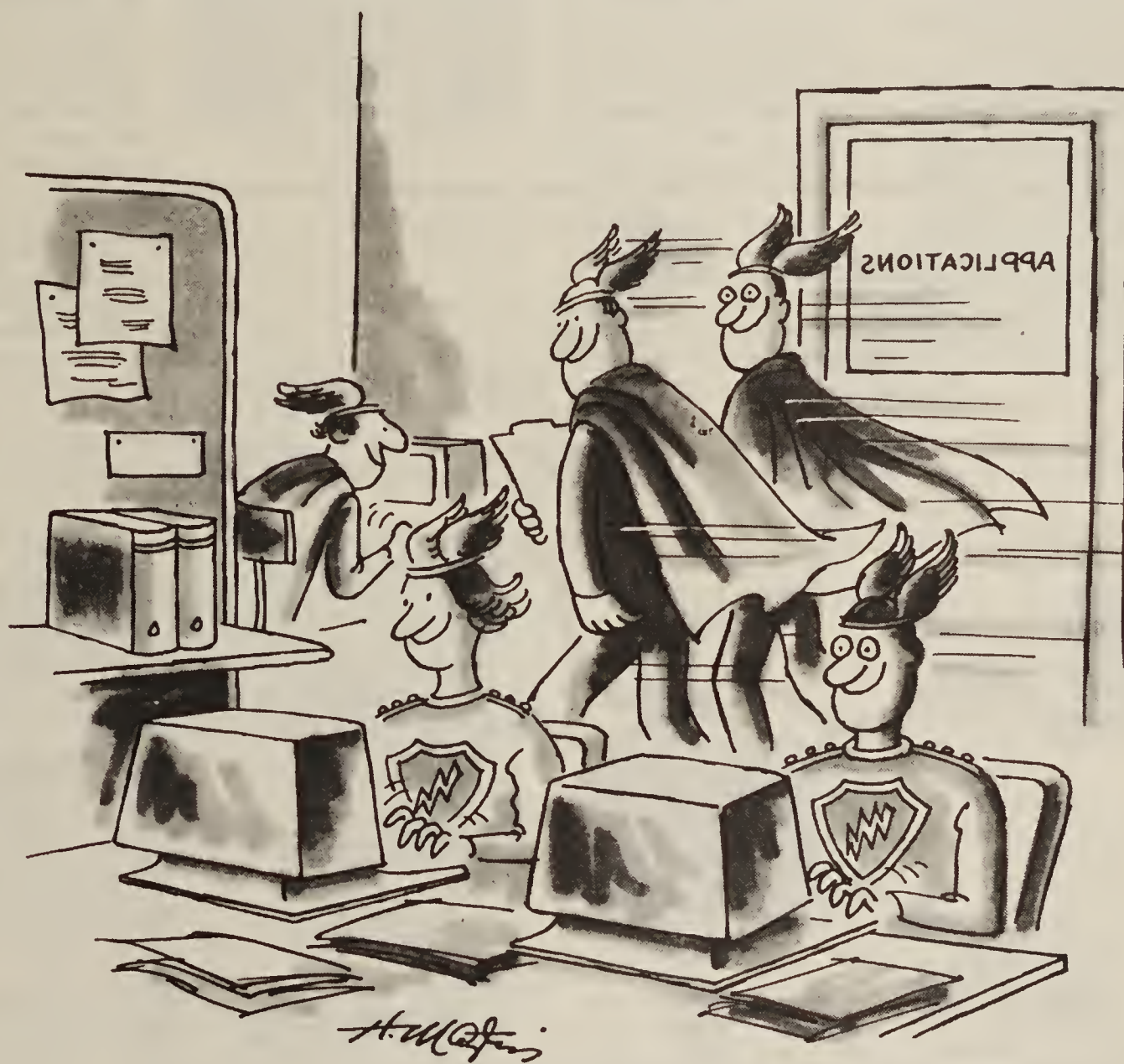
"Go for an advanced degree, preferably in a different discipline" from MIS, he recommends. "In the insurance industry, try for a CPA, CLU or actuarial degree."

Then try to get some business experience, possibly in marketing. Next, come back at a higher level in MIS, he says.

"Get a look at the big picture. Be a double or triple threat," Brophy urges. "That is kind of what I did." And keep honing your skills through education, he adds.

Taking his own advice to heart, Brophy recently completed a nine-week senior executives' program at MIT. He recounts that half the participants were from overseas and several were from Japan.

Brophy is now learning Japanese.



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Duncan

FROM PAGE 85

project must meet minimum standards of performance in all three areas. With the process aspect shortchanged, the software will be late and over budget.

Can the specialized skills of a project management professional really help that much? To answer that question, let's look at the project management practices of a profession with similar problems — construction engineering.

The design of petrochemical processing facilities, hydroelectric power plants and major high-rise buildings share certain key characteristics with software development. The projects are technically complex, often

have never been done before and are constrained by costs and schedules.

The most notable difference in the project management practices of the two professions is the degree of specialization in planning and control — in the process aspects. A construction project manager will have a specialist develop the estimates, schedules and progress reports. Software project managers will typically perform these planning and control tasks themselves.

Responsibilities overlap

The overlap between technical and process responsibilities creates a serious problem for software development: It inhibits the feedback cycle that is critical to improving performance. For example, what happens if

THE OVERLAP between technical and process responsibilities creates a serious problem for software development: It inhibits the feedback cycle that is critical to improving performance.

the estimator's task estimate is too low? On a construction project, the task manager tells the project manager. The project manager decides whose estimate is better and adjusts the plan accordingly.

On a software project, the project manager is the estimator: There is no independent third party to resolve the difference of opinion (and an estimate is just that, an opinion). Rather than blame his boss for a poor estimate, the task manager

looks for some other excuse.

The estimator does not get accurate feedback on the reason for overruns and thus continues to estimate inaccurately.

Is the construction engineering model really applicable to software development? Some industry authorities think so. In the 1960s, IBM proposed that software should be developed by a team of specialists headed by a chief programmer. The chief programmer would be responsible solely for the technical performance of the project team. The process responsibilities would be handled by other individuals.

More recently, structured analysis guru Tom DeMarco suggested that an independent estimating function is a prerequisite for successful software development. He proposed the creation of an independent estimating group whose members would be compensated according to the accuracy of their estimates.

Both proposals were based on the construction engineering model that recognizes the special skills of the project management professional.

The project management profession has other lessons to teach. Work breakdown structures, standard in the other engineering professions, can help make sure that necessary tasks are not inadvertently omitted.

Resource scheduling

Resource-based scheduling, rather than task-based scheduling, reveals that many software projects have nearly 100% of the work effort on the critical path. Thus slippage on almost any task will cause slippage on the entire project, and schedule delays not only become understandable, they become unavoidable.

Properly implemented, earned value reporting, which withholds credit for a task until it is actually completed, can give management a true picture of project status and eliminate the "It's 90% done" syndrome.

Despite these lessons, most software will continue to be developed the old-fashioned way — with the senior technical person responsible for process management as well. Most software will still be completed over budget and behind schedule. Most software will still be full of bugs long after it has been released to the user. Isn't it time we at least tried something new?

Duncan is president of Duncan Associates, a Lexington, Mass., project management consulting firm, and president of the Mass Bay Chapter of the Project Management Institute.

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Softer touch from Big Blue



About a month ago, this section of *Computerworld* reported the results of a recent survey that asked information systems executives of Fortune 500 companies to pick the top software companies in a variety of categories. Earning the "best" rating in six of 15 categories, covering mainframe, minicomputer and micro software, was the world's largest software company — even though the company gets only one-eighth of its revenue from software.

That, of course, is IBM. The survey, conducted by Wayne, Pa.-based research firm Donohue Associates, dovetailed appropriately with Big Blue's detailed 1987 financial results from its upcoming annual report.

IBM licensed \$6.83 billion worth of software — or "program products," in IBM lingo — worldwide in 1987, making the independent software industry's reigning giant, acquisition-gorged Computer Associates International, look like a relative midget.

That figure accounted for 12.6% of total IBM revenue — a small number, perhaps, but one that has grown at a very rapid clip over the past few years. In 1986, the bottom of the hardware slump for IBM, the company's software revenue percentage was 10.8%.

Comes through in pinch

The growth rates of IBM's software sales are staggering, especially in the context of overall revenue that grew just 2.4% in 1986 and 5.8% last year. Worldwide software revenue jumped 24% in 1987 — not bad for a business that's bigger than the entire corporate revenue of all but a handful of IBM's competitors. In the slump year of 1986, Big Blue's software sales soared 32%.

In the U.S. alone, IBM's software machine pulled in \$2.82 billion last year, up 19% from 1986. The growth rate in 1986 was only 8.8% but, excluding maintenance revenue, software was the only segment

Continued on page 97

Prime's Fischer pushes ahead

New CAD/CAM unit president reveals plans for a single Medusa version

Last week, Prime Computer, Inc.'s Robert A. Fischer was chosen to lead the world's second largest computer-aided design and manufacturing (CAD/CAM) vendor behind IBM.

After much speculation in the wake of Prime's successful hostile takeover of Computervision Corp., Fischer was appointed president of Prime's Computervision Division. Former Computervision President and Chief Executive Officer Robert L. Gable resigned to pursue personal interests.

Fischer will be responsible for the sales and marketing of all Prime and Computervision products to the manufacturing industry worldwide, while W. L. "Roy" Brubaker, Prime's vice-



Robert A. Fischer

president of worldwide sales, will head up sales and marketing to commercial and technical markets.

In an interview at Prime's Natick, Mass., headquarters prior to the reorganization with Laura

DiDio, a free-lance writer for *Computerworld*, Fischer spoke about his vision for the merged firms and disclosed for the first time that Prime will work toward a single version of Medusa, Computervision's drafting, design and documentation software that is licensed to Prime.

It's a well-known fact that Prime and Computervision have product line overlap, particularly with regard to Medusa. How will you resolve that?

We intend to eliminate any customer confusion by having a single version of Medusa. We're convinced that it's in everybody's best interests to end up with a single version of Medusa

that will be offered on a variety of platforms and that will incorporate the best application functionality of both products.

We plan to continue and enhance the two personal computer-based offerings [of Medusa], and give [Autodesk, Inc.'s] AutoCAD a run for their money.

All products will continue to be supported as though the [two] companies had remained independent. When, in the future, it is determined that there can be significant customer benefits and cost savings in merging

Continued on page 95

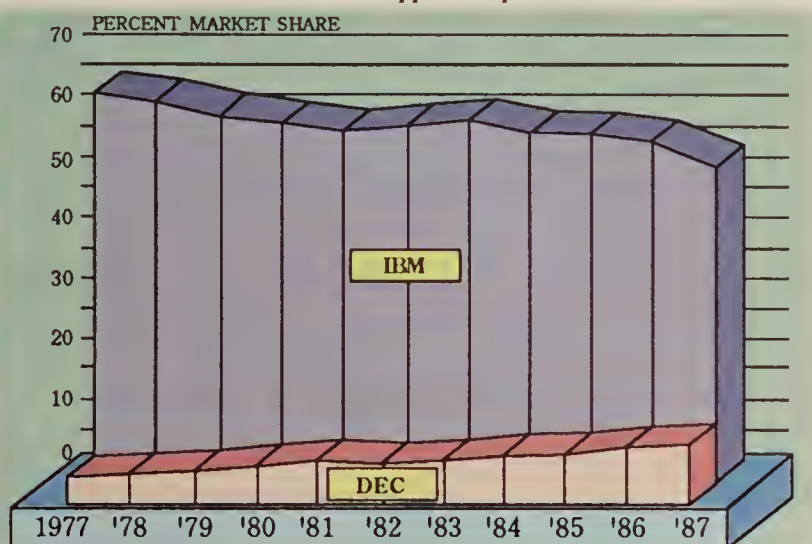
Inside

- Token-ring inventor allows IBM to use his technology in non-IBM equipment. Page 92.
- Ashton-Tate posts solid yearly, quarterly gains. Page 92.

Data View

Ten years of chipping away

DEC's worldwide market share* has doubled since 1977, while IBM's has dropped 12 points



* Each company's annual revenue as a percentage of total annual revenue of the top 16 U.S. computer vendors

INFORMATION PROVIDED BY SHEARSON LEHMAN HUTTON, INC. CW CHART

DCA still playing the field, searching for LAN mate

BY JAMES DALY
CW STAFF

ANALYSIS

ALPHARETTA, Ga. — Four months after unsuccessfully stalking general-purpose network vendor Ungermann-Bass, Inc., Digital Communications Associates, Inc. (DCA) insists that the prey may have escaped, but hunting season is far from over.

Ever since Ungermann-Bass rejected DCA's \$175 million marriage proposal last November, DCA has made it no secret that it is still shopping for a part-

ner that offers a comparable inroad into the local-area network market. Ungermann-Bass eventually agreed to a friendlier and more lucrative \$260 million offer from Tandem Computers, Inc. last month.

"We'll continue to look around the marketplace," admitted Craig Huffaker, DCA's executive vice-president. "Right now, we'd very much like to be in the LAN business."

DCA spokesman Bill Marx said his firm slices the LAN market into three segments: personal computer LANs, bridges and gateways and large terminal-to-

Continued on page 95

Intel CEO: 386 shortage to end soon

BY ALAN ALPER
CW STAFF

NEW YORK — Intel Corp. Chief Executive Officer Andrew Grove recently said the firm's 80386 production rate should balance with demand by mid-year, thanks to additional manufacturing capacity being brought on-line during the year.

As demand heated up for the 80386, the Santa Clara, Calif.-based chip maker was forced to put the high-performance 80386 microprocessor on allocation, or customer rationing, late last year.

Addressing a recent meeting of security analysts here, Grove

said Intel spent \$302 million last year upgrading both the capacity and capabilities of its manufacturing plants. This year, the firm plans to spend a record \$400 million.

'Never have enough'

"In our business, you never have enough capacity at the leading edge of technology," Grove said. "You always need to invest in both additional capacity and capability."

Grove said the impact of allocation on Intel's customers has been minimal. "Maybe not everybody got what they wanted, but they knew what they would get and got what they knew,"

Grove said.

Analysts said that although Intel would like to be able to ship more 386s, allocation has enabled the firm to maintain higher prices, which has helped profitability. It has also curtailed double ordering, which in the past has caused chaos when parts are in short supply.

Increases expected

Grove said that Intel expects to achieve "high single-digit" increases in sales and earnings in the first quarter.

He said that earnings growth in the quarter would have approached the 25% gain achieved in the preceding period if

changes in the firm's tax rate had not been factored in. Intel benefited from tax loss carryforwards in the fourth quarter last year.

Industry analysts were generally pleased with Grove's projections. Many had expected lower earnings growth because of increased research and development and sales expenses combined with less favorable tax treatment.

Constrained supply of the 80386 was also expected to have a more damaging effect on sales growth, they added.

"Business is clearly better than expected," noted John Geraghty, an analyst with First Boston Corp. "I had projected a 5% sales increase and envisioned cost pressure on the bottom line."

Soderblom renegotiates license with IBM

BY STANLEY GIBSON
CW STAFF

ROTTERDAM, Netherlands — Olof Soderblom, the inventor of the token-ring networking technology used in IBM's Token-Ring network, announced that he has reached a new licensing agreement with IBM, enabling IBM to sell its Token-Ring boards for use in non-IBM equipment.

The agreement will relieve dealers and users of the concern that an IBM Token-Ring board might not be covered under a patent license if it is used in a non-IBM computer, Soderblom said.

The previous agreement, reached in

1980, allowed IBM to implement the token-ring system in its own products only.

The patents on the technology invented by Soderblom are held by Willemijn Holding BV, located here, which carries on licensing activities on behalf of Soderblom.

Averting loss of business

According to Soderblom, some retailers had reportedly been selling IBM Token-Ring boards with IBM-compatible personal computers made by companies other than IBM.

IBM reportedly has agreed to pay the royalties on these boards so that users

will not feel it necessary to buy non-IBM token-ring boards for use in non-IBM equipment. Without the royalty agreement, users might have moved to token-ring boards made by an IBM competitor, Soderblom said.

IBM's previous payment was reportedly a lump sum of \$5 million. However, the new agreement calls for a royalty payment on each token-ring product shipped, Soderblom said, although he did not specify the amount.

The new agreement also includes a payment for boards that have already gone into non-IBM computers, Soderblom said.

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INDUSTRY WEEK IN BRIEF

Ashton-Tate Corp. reported solid gains in yearly and quarterly revenue and net income in results released last week. The microcomputer software developer reported yearly revenue of \$267.3 million, a 27% increase over 1986, while net income hit \$43.1 million, a 43% increase over the \$30.1 million reported a year earlier. Revenue for the fourth quarter, ended Jan. 31, was \$75.5 million, up 20% from the year-earlier level. Net income was \$12.8 million, a 21% increase.

Computervision Corp.'s top financial executive, Dorick V. Mauro, resigned from **Prime Computer, Inc.**, along with Chief Executive Officer Robert Gable (see story page 91). Prime Chief Financial Officer David J. Collard was named chief financial officer of Prime's new Computervision Division. One top Computervision executive will remain; Vice-President and Treasurer Richard L. Buckingham was named to the same posts at Prime.

Honeywell Bull, Inc., the global information systems company formed last March by **Compagnie des Machines Bull** in France, **Honeywell, Inc.** in the U.S. and **NEC Corp.** in Japan, announced healthy revenue but slim profit margins during its first full year of operations. Revenue for 1987 clocked in at \$2.06 billion, compared with revenue of \$1.9 billion achieved by Honeywell's computer operations in 1986. Net income for the year, however, was only \$17.4 million.

Data Architects, Inc. announced that it will merge with **Logica PLC**, a British software development and consulting company, in a \$37.8 million deal. Logica, with annual revenue of about \$125 million, will merge its North American operations with the Waltham, Mass.-based company to form a wholly owned subsidiary of Logica. Data Architects is a 21-year-old vendor of electronic funds software, network services and other products.

Former **Paradyne Corp.** Chairman Robert Wiggins has been named chairman and chief executive officer of **Technology Research Corp.** in Clearwater, Fla. In his 13 years at Paradyne, Wiggins led the firm from a \$2.5 million to a \$250 million a year company. He resigned last year after the Largo, Fla., communications products maker pleaded guilty to charges of defrauding the Social Security Administration.

Software AG Systems, Inc. agreed to be acquired in full by its West German equity partner, **Software AG**, for approximately \$50 million. The Darmstadt, West Germany-based developer of Adabas currently owns 22% of Reston, Va.-based Software AG Systems.



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DCA playing field

CONTINUED FROM PAGE 91

host general-purpose LANs.

Marx said DCA addresses PC LANs with products from its 10Net Communications subsidiary and connectivity with its Irmalan family, but DCA's terminal-to-host segment affords room to grow.

While the firm may develop such a product line in-house, it has a history of talking with its wallet. Last year, DCA bought low-end LAN gear maker Fox Research, Inc., which was renamed 10Net. In 1986, DCA purchased Microstuf, Inc., Cohesive Network Corp. and Irma board maker Forte Communications Co.

But last year's flurry of networking mergers means pickings are getting mighty slim. "Unfortunately, nobody offers the breadth of what Ungermann-Bass did," said Richard Kimball, senior research analyst at Montgomery Securities in San Francisco. "Ungermann-Bass had a large base with a strong sales and customer support organization. Right now, there isn't any one company that can give [DCA] that."

While DCA does not need to acquire anything — last year's revenue topped \$181 million, and the firm boasts a \$102 million cash reserve war chest — "they really need to round out their product line," said Mary McCaffrey, vice-president of Cyrus J. Lawrence, Inc. in New York. "They're hitting communications managers on the wide-area side and PC distribution channels, but they don't have the core LAN products that would be sold directly to MIS directors."

Likely matches

Following this scenario, the leading prospects on DCA's shopping list of independent LAN vendors include the following:

- **Sytek, Inc.** Parent company General Instrument Corp. has been trying to sell its majority share for more than a year, but the price is reportedly too high. Mountain View, Calif.-based Sytek recently launched more than two dozen new products to propel its broadband terminal-to-host network focus into the general-purpose LAN mainstream. But the company is extremely late to market, having suffered market and personnel setbacks. However, Sytek claims seven straight quarters of profitability and would probably be the easiest to buy.

- **Proteon, Inc.** Also rumored to be searching for a buyer, the token-ring maker should be benefiting greatly from the shortage of IBM Token-Ring adapters, as well as IBM's speed limitation of 4M bits. But Proteon has been dogged by distribution problems. Company officials maintain that once the Fiber Distributed Data Interface, a proposed LAN standard for fiber optics, is approved, the Natick, Mass.-based company will take off. That remains to be seen.

- **Banyan Systems, Inc.** The Marlboro, Mass., vendor boasts highly sophisticated network software backed by a small but fanatically loyal user base. Its Achilles heel until now has been weak marketing and distribution. Rumored to be grooming itself for an initial public offering, Banyan could use a cash infusion to really get going.

- **Excelan, Inc.** Known for its commitment to the Transmission Control Protocol/Internet Protocol, Excelan last year purchased Kinetic Systems Corp., a maker of Apple Computer, Inc. connectivity

products. The Kinetic line is a nice fit with DCA's Macirma board connecting the Apple Macintosh to IBM mainframes. San Jose, Calif.-based Excelan is probably the least likely candidate to be for sale, but it offers departmental network focus, which is what DCA needs.

DCA may also try an end run with a smaller, lesser known and, consequently, less expensive firm.

"If the key to their growth is simply technology acquisition, then the opportunities become a lot broader," says Alice Bradie, an analyst with Hambrecht & Quist, Inc. "They may look for a small firm with a technology that they can grow."

Senior Editor Patricia Keefe contributed to this report.

Prime's Fischer

CONTINUED FROM PAGE 91

products, migration assistance or bridges will be made available to help customers take advantage of the new offerings.

However, no customer will be coerced or forced to convert. I also want to assure customers that their accounts will be the total responsibility of one and only one sales and support organization.

When will you drop the second Medusa line?

There's been no date set.

Are there plans to meld or drop any other products at this point?

We really mean it when we say we presently have no firm decisions in this area . . . and we won't until we've had the benefits of teams from both companies working together to do the evaluation and make recommendations. And again, there's no time frame set for its completion.

On paper, it looks like Prime can't lose with this merger.

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Continued on page 97

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Spotlight is a series of pullout sections within *Computerworld*, each focusing on one product category. With 24 Spotlight sections in 1988, you'll get the purchasing specifics you need for PCs, LANs, printers and productivity software — to name just a few. Each Spotlight contains quick reference specification charts that compare products on a feature-for-feature and dollar-for-dollar basis. Plus related editorial on real-life applications, interviews, vendor viewpoints and market trends. And since it's a pullout section, you'll be able to save and refer to this information as you need it.

If you're involved in buying products, *Computerworld* Spotlight is the section you'll be turning to throughout 1988. And if you're marketing computer products in any of the Spotlight categories covered, you should be putting your message where your market is. Our schedule of 1988 Spotlight topics is listed at the left for your reference.

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Feb. 29	Performance Management/ Capacity Planning	Feb. 12	
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Apr. 11	PCs (IBM-compatible)/ Portables/Laptops	Mar. 25	
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Sept. 26	Hardware Roundup: Small Scale Systems	Sept. 9	TCA
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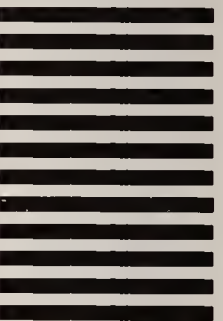
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Prime's Fischer

CONTINUED FROM PAGE 91

and commercial sales. So Computervision has become 50% of our activity.

We now also have \$100 million in operating revenues since the merger. And we've moved up about a hundred places in the Fortune 500. Prime and Computervision combined are the 242nd-ranked Fortune 500 company, as per the last available 1986 figures.

Our combined R&D investment for 1988 will reach in excess of \$150 million, far more than either company could have made alone.

Now that the Computervision ac-

quisition has been finalized, what else can we expect to see from Prime this year?

First is to buy a company like Computervision. "Strategic alliances" is a euphemism for our buying technology in the manufacturing and engineering area. There are companies that are starting to develop programs that do materials selection and process planning and cost estimating and fixturing and add intelligence to processes that have been done manually for years.

So Prime is looking to buy some software products and combine them with our product line. We'll also be developing interfaces to some of the commonly accepted MRP II systems — that's internal development.

We need to find a strong partner — and I think I can mention who the players are — like an Allen-Bradley, Gould or Siemens, who are strong in the shop floor area.

The last thing we'll do in '88 is to buy some custom systems integration capability. We'd like to have \$20 million to \$50 million in revenues coming out of selling services to companies where they want to take some of our products that they have installed and some of somebody else's and get them all together.

What do you see as being your hot products, and what forthcoming products can we expect Prime to introduce?

Prime has a current technology interac-

tive design modeler, which will be introduced in April, called the Project Control System. It's in beta test now. It's written on top of [Oracle Corp.'s data base] Oracle and resides in one of the Prime 50 series computers. It does configuration management.

The Project Control System doesn't care whether you're dealing with geometry or coded data image graphics, and it provides the upstream link to the IBM and DEC environment which you find in so many companies these days.

Additionally we see Computervision's CADD4X as being at the core of any product line hoping to maximize 3-D penetration of major accounts — in particular, it is strong in aerospace and automotive accounts.

Wilder

CONTINUED FROM PAGE 91

of IBM's U.S. business to grow at all.

Looking at these results — and heeding the opinions of corporate information systems executives in the Donohue survey — perhaps it's time to rethink the conventional wisdom of IBM's viewing software primarily as a means to push more boxes — 3090s, no doubt — out the door.

With the 3090 now on the downside of its product life cycle, Silverlake still in the speculation stage and the 9370 still trying to shake the ubiquitous prefix "disappointing," most of the excitement coming out of IBM for the past several months has been software related. It has become clear that IBM's Systems Application Architecture (SAA) and Application Systems Division, even though their details and missions might be fuzzy, are the wave of the future as far as IBM top management is concerned.

In his annual letter to IBM stockholders, IBM Chairman John F. Akers reveals that Big Blue, at a time of celebrated corporate retrenchment, belt-tightening and even facilities closing, has increased its U.S. programming ranks in the past three years by approximately 6,000.

During a period when U.S. sales of its lifeblood processors and peripherals have declined for two straight years — and its deeply discounted maintenance services dropped 8.2% in U.S. revenue last year — software is currently the major growth industry within IBM domestically. IBM knows this and will continue to treat it that way. Because of the IBM operating system stranglehold, it's the only part of the business that is strongly protected from recession and slow capital spending.

As a result, we will see, at the very least, several things from Big Blue:

- A continued hard line on IBM's object-code-only access policy to independent developers, much to the consternation of ADAPSO.
- Continued operating system upgrades and improvements — for the right price.
- Lots more SAA missionary work at customer and industry gatherings.

One year from now, when IBM reveals the breakdown of its 1988 revenue sources, you can bet that software will have registered another healthy increase in both sales growth and its percentage of the total IBM dollar mix. That's a sure thing — a rarity in this business.

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COMPUTER CAREERS

Trains, planes and automobiles: Automation boom drives need for MIS

BY ROSE MULA
SPECIAL TO CW



The need to ship tons of freight and move millions of people more quickly and efficiently than ever before is causing a frenzy of automation in the transportation industry and an increasing demand for MIS professionals.

As with most things in transportation, location is everything. MIS professionals willing to relocate to a company's strategic areas will find numerous opportunities.

"We're always looking for good people for our Dallas/Fort Worth and Tulsa headquarters," says Joseph Selman, corporate communications senior representative for American Airlines.

Feds out of driver's seat

Deregulation is also driving demand for computer professionals in the airlines. Prior to deregulation, life was a lot simpler, according to Selman. "We flew straight lines and had only one or two fares per route. Today, the routes and fare structures for all airlines are extremely complex. Computerization arrived in the nick of time," he says.

For example, American Airlines needs a large staff of programmers and planners to run systems that help plan how many seats to sell, what fares to charge and which routes the airline should fly. The company also requires data base managers to administer Sabre, American's massive computerized reservations system that it also licenses to other airlines.

On a smaller scale, in the less complex field of the trucking industry, requirements for MIS professionals are also great.

"Communication is crucial to our business. We must have an integrated system that ties all our offices together," says Robert Dirks, executive vice-president of Minneapolis-based Berger Transfer and Storage, a \$30 million company.

Berger recently became an agent for Allied Van Lines, Inc. and is doing business with various freight brokers around the country. "We have to communicate with all of them as well," Dirks says. "Frankly, we haven't been able to hire enough people with the expertise to pull it all together."

"We want people experienced in data processing, but we're not looking for any specific educational or training background. Mainly, we need people

with common sense," he adds.

Openings in trucking do not necessarily require a background in the industry. In fact, Dirks says, it is advantageous for his company to bring in people from other industries who can provide a fresh viewpoint.

IT'S GOOD to have outsiders come in who are willing to challenge us and point us in other directions."

ROBERT DIRKS
BERGER TRANSFER AND STORAGE

"Because of government regulation, we have done things the same way for so many years that many of us fall into the trap of thinking there is no other way to do them. I think it's good to have outsiders come in who are willing to challenge us and point us in other directions," Dirks says.

On another track

Opportunities for MIS professionals also abound in the railroad industry, says John Tierney, senior vice-president for materials and systems at Burlington Northern Railroad Co. As with the airlines, deregulation is creating a more competitive environment.

"The good news for MIS people, at least in our company, is that we're looking forward to pushing technology out into the operations of the railroad to a much greater extent than ever before," Tierney says.

Currently, Burlington Northern is moving technology out into the field by supplying its workers with hand-held data collection devices. Workers in remote locations gather data and transmit it by telephone to either personal computer or main-

framing to Mike Kaminski, manager of the Manufacturing Automation Protocol program at General Motors Corp.

Stuff dreams are made of
"The automobile industry is right on the threshold of the future," Kaminski says. "All those things we used to read about in comic books — automobiles guided electronically and traveling at great speeds with no risk of accidents — it's all going to happen soon."

Such futuristic goals are a dream scenario for MIS professionals, he adds. "We need professionals to direct us toward these new, innovative areas. MIS people in the automotive industry in general, and General Motors in particular, are on the brink of a very challenging future," Kaminski says.

Qualified MIS professionals who want to jump on the GM bandwagon may find a location near them. "We have plants all over the country. I see tremendous opportunities everywhere for the right people," he adds.

The right people, as far as GM is concerned, are aggressive professionals who possess technical backgrounds and are well educated. "We want more master's degrees, more comprehensive computer knowledge; people with energy, drive and flexibility; people who want to participate in and contribute to our future," Kaminski says.

frame receivers where the data can be manipulated as needed.

Last year, Burlington Northern increased its staff significantly, "but we still need very, very good people at all levels for our headquarters operations in St. Paul, near Kansas City and in Fort Worth," Tierney says.

The company also recently completed a comprehensive compensation study to ensure that its salaries are competitive. "As a result, we plan to raise salaries of many of our present MIS employees to bring them in line with what we offer to attract new people."

The picture is also bright on the automotive front, at least ac-

Mula is a Waltham, Mass.-based freelance writer.

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Systems Specialist

Responsibilities will include: generating, installing, maintaining and enhancing the Laboratory's operating systems.

Networking Specialist

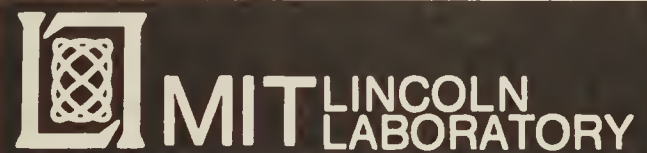
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Current Hardware and Software includes IBM 3081, Amdahl 470/V8, IBM 4381, VM/SP, Ethernet, TCP/IP.

Interested candidates are invited to forward their resumes to Rosemary Malvermi, MIT Lincoln Laboratory, Box CW1, 244 Wood Street, Bldg. A-128, Lexington, MA 02173.

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PROGRAMMER/ANALYST IBM SYSTEM/38

The Orleans Parish Criminal Sheriff's Office in New Orleans, LA is seeking programmer/analysts to add to their present staff. The successful candidate will have a minimum of one year experience in a structured RPG III environment with emphasis in systems design and on-line programming. A bachelor degree in a related field as well as experience with J.D. Edwards integrated financial software a plus.

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Submit resume to:

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Brown University
Box 1879/MG721
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Design, develop and maintain software for 3D seismic processing for land, marine and transition zone surveys. Maintain and coordinate navigation and positioning software for on-board and in-house use. Develop expert system and graphics tools to assist in seismic processing. Supervise a group of Senior and Junior Programmers in the above. Conduct training for both company personnel, national and foreign clients in these areas. Need Bachelor of Science degree or Equiv. in Applied Mathematics. Need one year exp. as Seismic, Programming Supervisor, or two yrs. as Senior Programmer, Research Geophysicist. 40 hrs/wk. \$42,000 per year. Apply at Texas Employment Commission, Houston, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778, J.O. #47-938-54. Ad paid by an Equal Employment Opportunity Employer.

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DB2/SQL
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Suite 300
Sacramento, CA 95825
(916) 929-2729
or
3478 Buskirk Ave.
Suite 1045
Pleasant Hill, CA 94523
(415) 935-3414

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The successful candidate will be a strong communicator with broad mainframe experience who can interact efficiently with Information Services. Background should include 3+ years COBOL, ADABAS, JCL, TSO, SFP and 2 or more years of CICS, BMS and ADAPREP. Major duties involve acting as advocate for applications developers to Information Services concerning changes in software.

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Qualifications include 2+ years successful experience in ADABAS/NATURAL, CICS and COBOL. Position entails supporting the MIS Applications Dept. PC background would be a plus.

Applicants with the ABOVE EXPERTISE, who feel they can make a valuable contribution in our highly technical marketplace, are urged to apply. If a truly competitive salary and comprehensive benefit package interest you, send resume (DETAILING SPECIFIC POSITION OF INTEREST) with salary history and requirements to

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Betty Corpening, Recruitment Specialist
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**University of Alaska
Computer Network**
303 Tanana Drive
Room 3 Bunnell Bldg.
Fairbanks, AK 99775-5180

Closing Date: March 31, 1988

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DIRECTOR OF ACADEMIC COMPUTING SERVICES

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The Director should have experience in computer operations, administrative functions, and be highly knowledgeable of computer hardware, software, and technical approaches to network and computer operations in general. Knowledge of telecommunications systems and experience in an academic institution are desirable. A doctorate is desirable but not required.

Founded in 1826, Lafayette College is a highly selective, independent, undergraduate, coeducational, residential institution of about 2,000 students. The College offers the AB in 22 fields and the BS in six fields of science and five fields of engineering.

Academic computer facilities consist of VAX 11/750 and AT&T 3B15 minis, and 100 microcomputers - IBM PC/ATs with EGA, PS2 Model 50's, and compatibles. Administrative computer facilities consist of a VAX 11/785 network with 20 microcomputers.

Women and minorities are encouraged to apply. Letter of application, resume, and three letters of reference should be sent to the Office of the Provost, ACS Search Committee, Lafayette College, Easton, PA 18042. An equal opportunity employer.

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engineering

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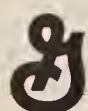
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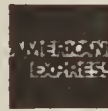
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EGA market image sharpens

Run on boards, monitors result of vendors' neglect, lack of full systems

BY ELIZABETH LOZANO
BOSTON COMPUTER EXCHANGE CORP.

The used microcomputer market pace picked up during the week ending Feb. 26, as the continuing shortages of standard full systems fueled component trading.

The Big Board showed heavy trading of 20M-byte hard drives, IBM Enhanced Graphics Adapter (EGA) monitors and laser printers. The decision made by IBM and Compaq Computer Corp. to drop the EGA monitor standard and focus their attention on the newer monitor standards has set the stage for a run on EGA boards and monitors.

State-of-the-art equipment users report their willingness to dump the EGA, though other savvy buyers see an opportunity to upgrade more of their units to the EGA.

End users, leasing companies and resellers are in hot pursuit of any IBM Personal Computer, PC XT and PC AT standard models that are available. The average user is still reluctant to buy into the Personal System/2 lines, given software issues.

As a result, the PC XT Model

089 and AT Model 339 are that user's default solutions. As one user commented, "Buying new technology is not the answer for me. I want to buy a machine that's like the rest of the ones in my office."

The AT Model 339 closed up, at \$3,400, under supply shortage conditions. The 6-MHz, 20M-byte AT Model 099 also closed up, at a price of \$2,350.

Dealers, in a state of panic, sought reliable supply of the XT Model 089, but to no avail. The machine traded up, at \$1,750, in single-unit transactions. The XT Model 086 was the only IBM PC-DOS machine that dropped in value during the last week of February. The basic dual-floppy-drive monochrome PC Model 076 closed even, at \$825, with few quantity lots available.

Compaq trading was flavored by erratic supply conditions throughout the week. The Portable I traded up, at \$800, as a result of supply shortage conditions early in the week. The Portable II closed down, at \$1,625, with an increase in supply at the end of the week. The Portable III closed up, at \$2,775, as demand for this model continued to grow.

The older portable Compaq Plus was the only Compaq model that experienced steady conditions. It traded at \$1,350. The Deskpro lines performed well throughout the week, with the Deskpro 286 experiencing an increase in volume, trading at \$2,300. The Deskpro 386 was exchanged at \$4,275, representing the clear choice of power users.

Macintoshes silent

Nothing was new in the Apple Computer, Inc. Mac world the week ending Feb. 26. The Macintosh SE with two floppy drives traded even at \$1,875; the 20M-byte hard-drive version struggled to maintain its value and closed at \$2,600. The Macintosh Plus held steady at \$1,250, experiencing a marginal decrease in demand.

The lower end of the Macintosh line increased in value, illustrating the market's strong demand for proven technology.

The Mac 512E closed up, at \$975, while the original "Fat Mac," the Mac 512, brought a price of \$825.

The scramble for used Imagewriter I and II units raged on.

The BoCoEx Index

Closing prices report for the week ending Feb. 26, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	\$825	\$900	\$600
XT Model 086	\$1,325	\$1,425	\$800
XT Model 089	\$1,750	\$1,875	\$1,000
AT Model 099	\$2,350	\$2,425	\$1,950
AT Model 339	\$3,400	\$3,600	\$2,400
Compaq Portable I	\$800	\$925	\$650
Portable II	\$1,625	\$1,900	\$1,475
Portable III	\$2,775	\$3,000	\$2,175
Plus	\$1,350	\$1,400	\$975
Deskpro 286	\$2,300	\$2,475	\$2,050
Deskpro 386	\$4,275	\$4,575	\$3,600
Apple Macintosh 512	\$825	\$900	\$650
512E	\$975	\$1,075	\$800
Plus	\$1,250	\$1,350	\$950
SE	\$1,875	\$2,100	\$1,600
II	\$4,000	\$4,200	\$3,500
Hewlett-Packard Laserjet	\$875	\$975	\$550
NEC 7730	\$450	\$550	\$300
DEC LQPO2	\$700	\$975	\$250

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

Like the bank at lunchtime on a Friday, users stood in line waiting for available Imagewriters. The Imagewriter I closed at \$300; the Imagewriter II closed at \$350. Laserwriter trading was virtually nonexistent during the week, as the long-awaited ar-

rival of the Laserwriter II encouraged users to evaluate their options before purchasing equipment.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

IBM cartridge tape market records success

BY ROBERT CALLERY
IDC FINANCIAL SERVICES CORP.

During the past 12 months, prices for used IBM 3480 cartridge tape units have been very stable.

This stability is a result of two factors: a fairly limited supply of machines on the secondary market, caused by the slow migra-

tion of users in the tape market, and the lack of an alternative high-end tape product available from IBM, to which users would be able to migrate.

By year-end 1985, the 3480 made up only 9% of the total installed base. Two years later, that percentage rose to 27%. By year-end 1988, International Data Corp. (IDC) estimates the

installed base of cartridge tape will be almost 40%.

Even though this was IBM's first major tape announcement since the 3420 Model 8 was introduced in 1973, it took almost four years for the 3480 to capture 40% of the market.

The latest IDC projections for the first half of this year call for approximately 2,800 units to ship domestically. However, when looking at the entire installed base of tape drives, the older 3420 reel-to-reel still outweighs the newer 3480. Yet each year, the gap is narrowing.

Slow development

These figures clearly illustrate a slower migration in the tape market compared with other IBM peripherals. Since this migration has been slow, the development of the secondary market has also been slow.

As recently as March 1987, two years after the 3480 first shipped, there were very few used machines available. Since there were no other high-end tape products available from IBM, this was not surprising.

Typically, when machines ap-

pear on the secondary market, users are displacing older equipment and moving to a replacement product. In this instance, since there are no other products users can move to, the main sources of used boxes are consolidation of data centers, bank-

quantities of 3420s to appear on the secondary market.

Retail prices on the secondary market for 3420 Model 8s are approximately 11% of the list price, or \$2,500, and the supply is practically endless.

Most third-party dealers are selling machines from inventory, which leaves end-user take-out offers very low. If dealers have

THE OLDER 3420 reel-to-reel models have been in a steady state of decline for some time now, with the 3420 Model 8 the only tape with much value left.

ruptcy cases or overpurchasing.

This pricing trend is likely to continue until IBM announces an alternative product to the 3480, which IDC says will happen this year.

The older 3420 reel-to-reel models have been in a steady state of decline for some time now, with the 3420 Model 8 the only tape with much value left. The demise of this tape drive is due to the fact that most users migrate from the 3420 to the newer 3480 cartridge tape drive. This has caused large

inventoried stock to sell, they are unlikely to pay very much for an end user's machine, unless forced into it by the structure of a deal.

With the 3480s trading at 90% or so and the 3420s at 11% or less, the used tape market is in a state of contrast. Great bargains can be found at the low end, while the newest technology is still quite expensive.

For more information, contact IDC Financial Services Corp.'s Terri LeBlanc at 617-872-8200.

IBM tape products

Current retail fair market value

	Date shipped	List price	Percent of list price
3420 Model 4	4Q 1973	\$16,870	3%
6	4Q 1973	\$19,710	5%
8	4Q 1973	\$21,860	11%
3480 A22	1Q 1985	\$65,430	90%
B22	1Q 1985	\$43,120	90%
A11	1Q 1987	\$49,080	New
B11	1Q 1987	\$38,810	New
3422 A1	1Q 1986	\$40,480	New
B1	1Q 1986	\$19,690	New

INFORMATION PROVIDED BY IDC FINANCIAL SERVICES CORP.
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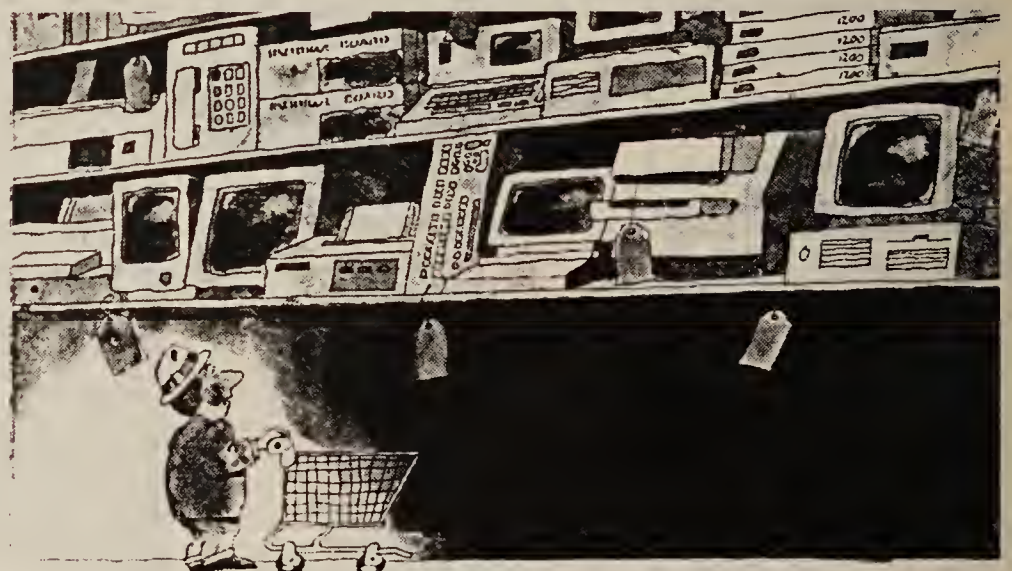
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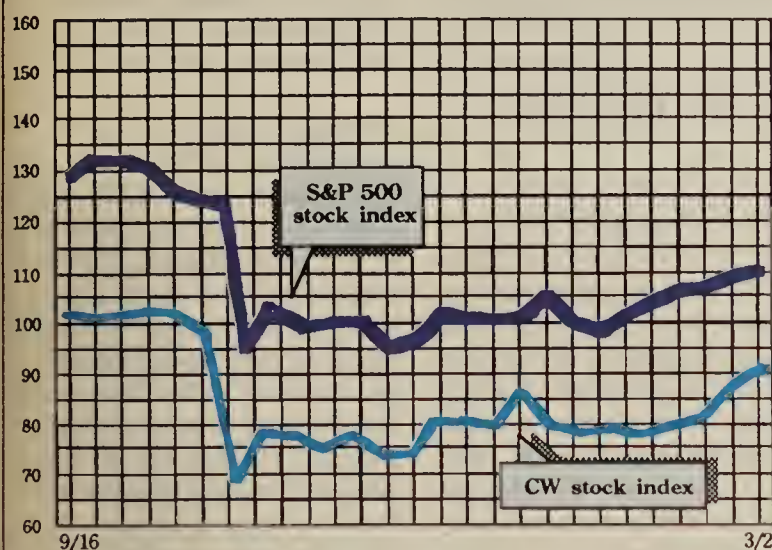
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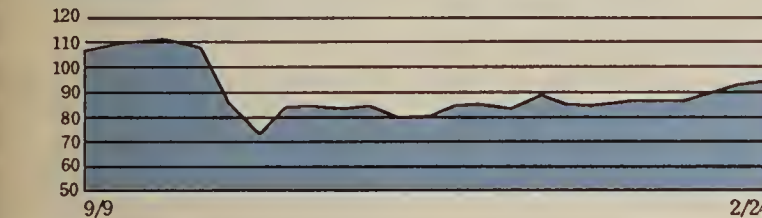
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March 28	Micro-to-Host-Links	March 11
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	Portables/Laptops	March 28
April 25	Electronic Publishing	April 8
May 9	Printers	April 22
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June 20	The SNA Market	June 3
July 11	Disaster Prevention & Recovery Products & Services	June 24
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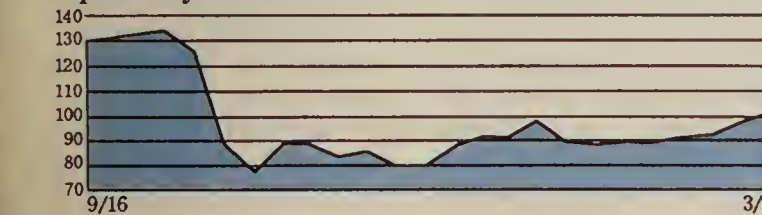


Indexes	Last Week	This Week
Communications	92.4	95.8
Computer Systems	97.0	101.4
Software & DP Services	99.3	101.6
Semiconductors	62.2	64.0
Peripherals & Subsystems	85.1	87.3
Leasing Companies	113.3	121.9
Composite Index	87.1	90.2
S&P 500 Index	109.3	110.8

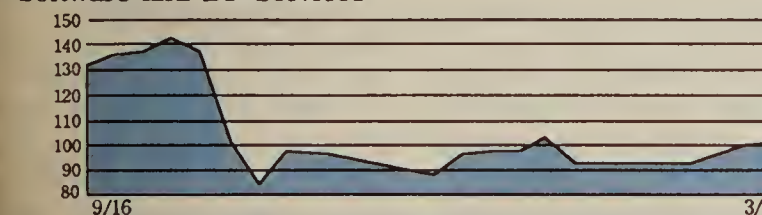
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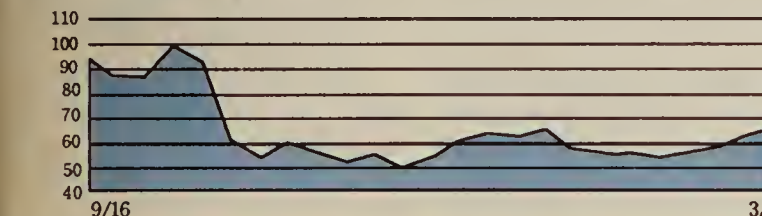
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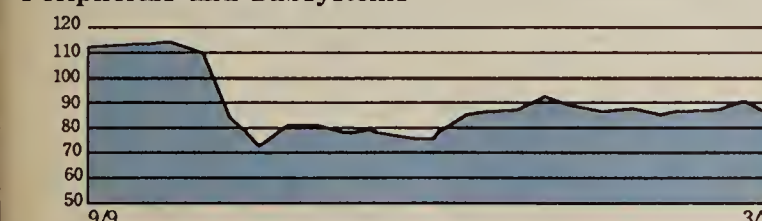
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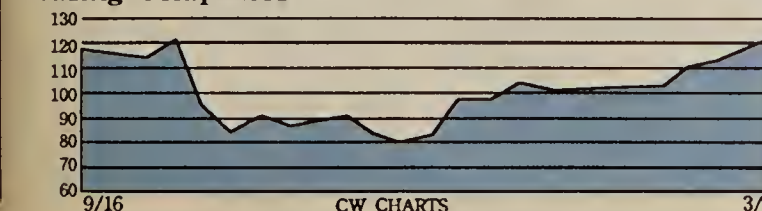
Semiconductors



Peripherals and Subsystems



Leasing Companies



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 2, 1988

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Communications and Network Services

			52-WEEK RANGE (1)	PRICE CLOSE MARCH 2 1988	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	100	74	94.63	2.0	2.2
Q	ANDREW CORP	19	11	15.25	0.5	3.4
Q	ARTEL COMM CORP	4	2	1.81	0.1	3.6
N	AT&T	36	20	29.38	0.0	0.0
Q	AVANT GARDE COMP INC	6	2	1.94	0.1	3.4
N	AVANTEK INC	19	6	7.25	0.0	0.0
N	AYDIN CORP	38	16	22.63	-0.4	-1.6
N	BELL ATLANTIC CORP	80	61	72.00	1.1	1.6
N	BELLSOUTH CORP	44	29	40.75	-0.4	-0.9
Q	COMPRESSION LABS INC	7	2	3.13	-0.4	-10.7
Q	COMPUTER NETWORK TECH	6	2	1.69	0.0	0.0
Q	CONTEL CORP	40	25	34.13	0.4	1.1
Q	DATA SWITCH CORP	9	4	7.75	0.6	8.8
Q	DIGITAL COMM ASSOC	49	20	32.13	2.1	7.1
Q	DYNATECH CORP	43	14	21.50	1.3	6.2
Q	FIBRONICS INTERNATIONAL INC	11	2	4.00	1.3	45.5
Q	GANDALF TECHNOLOGIES	11	5	6.50	0.5	8.3
Q	GENERAL DATACOMM INDS	14	3	3.88	0.3	6.9
N	GTE CORP	45	29	38.88	0.4	1.0
Q	INFOTRON SYS CORP	12	5	8.25	1.0	13.8
N	ITT CORP	66	42	48.38	1.4	2.9
N	M A COM INC	16	7	10.50	0.1	1.2
Q	MCI COMMUNICATIONS CORP	12	6	11.38	0.1	1.1
Q	MICOM SYS INC	17	7	11.38	0.5	4.6
Q	NETWORK SYS CORP	18	7	9.13	0.8	9.0
N	NORTHERN TELECOM LTD	24	14	19.13	0.0	0.0
Q	NOVELL INC	30	12	19.88	-2.4	-10.7
N	NYNEX CORP	78	58	70.38	0.8	1.1
N	PACIFIC TELESIS GROUP	34	9	28.75	0.1	0.4
N	PARADYNE CORP	9	4	5.88	0.6	11.9
A	PENRIL CORP	6	1	4.25	0.5	13.3
N	PLESSEY PLC	41	23	31.00	1.3	4.2
N	SCIENTIFIC ATLANTA INC	20	8	14.00	0.1	0.9
N	SOUTHWESTERN BELL CORP	46	22	38.00	0.6	1.7
Q	3 COM CORP	26	12	21.00	-0.9	-4.0
N	TIMEPLEX INC	41	17	32.25	0.0	0.0
N	UNGERMANN BASS INC	16	5	12.25	-0.1	-1.0
N	U S WEST INC	60	43	55.13	0.1	0.2

Computer Systems

Q	ALLIANT COMPUTER SYS	37	5	7.00	-0.3	-3.4
Q	ALPHA MICROSYSTEMS	6	3	4.13	0.1	3.1
Q	ALTOS COMPUTER SYS	16	9	11.50	0.5	4.5
A	AMDAHL CORP	50	19	34.38	-1.1	-3.2
Q	APOLLO COMPUTER INC	25	9	16.25	0.8	4.8
Q	APPLE COMPUTER INC	60	28	44.75	2.5	5.9
N	BOLT BERANEK & NEWMAN	28	12	15.25	1.4	9.9
Q	BRITTON LEE INC	5	1	1.56	-0.1	-3.8
N	COMPAQ COMPUTER CORP	79	26	50.38	3.3	6.9
Q	COMPUTER AUTOMATION INC	17	5	12.88	-0.1	-1.0
A	COMPUTER CONSOLES INC	11	2	5.13	0.0	0.0
Q	CONCURRENT COMP CORP	24	11	18.00	2.0	12.5
Q	CONTROL DATA CORP DEL	38	18	26.13	0.6	2.5
Q	CONVERGENT TECH	11	3	3.63	0.1	3.6
Q	CONVEX COMPUTER CORP	22	6	8.63	0.0	0.0
N	CRAY RESH INC	136	47	84.88	4.0	4.9
Q	DAISY SYS CORP	13	5	7.50	0.3	3.4
N	DATA GEN CORP	37	16	27.25	-0.5	-1.8
N	DATAPOINT CORP	9	3	4.13	0.0	0.0
N	DIGITAL EQUIP CORP	200	110	120.25	-5.3	-4.2
N	FLOATING POINT SYS INC	16	3	4.25	0.3	6.3
N	GOULD INC	34	8	12.13	-0.1	-1.0
N	HARRIS CORP	43	22	29.75	1.0	3.5
N	HEWLETT PACKARD CO	74	36	64.63	4.1	6.8
N	HONEYWELL INC	91	49	65.00	0.8	1.2
N	IBM	176	102	117.25	1.1	1.0
Q	INFORMATION INTL INC	17	9	13.00	1.8	15.6
Q	IPL SYS INC	3	1	2.50	0.5	25.0
Q	MASS COMPUTER CORP	14	5	6.75	-0.1	-1.8
N	MATSUSHITA ELEC INOL LTO	196	93	187.13	7.5	4.2
Q	MEGAOTA CORP	6	3	3.63	0.8	26.1
Q	MENTOR GRAPHICS CORP	39	14	27.75	0.5	1.8
N	NBI INC	14	4	6.38	1.1	21.4
N	NCR CORP	87	50	64.00	-0.4	-0.6
N	PRIME COMPUTER INC	31	12	18.63	0.8	4.2
Q	PYRAMIO TECHNOLOGY	12	5	10.50	2.8	35.5
Q	STRATUS COMPUTER	41	15	27.00	0.0	0.0
Q	SUN MICROSYSTEM INC	46	14	33.75	-1.3	-3.6
Q	SYMBOLICS INC	6	1	1.53	0.0	2.1
N	TANDEM COMPUTERS INC	38	17	20.75	-0.9	-4.0
N	TANDY CORP	57	28	40.63	2.3	5.9
N	ULTIMATE CORP	37	15	14.75	-0.4	-2.5
N	UNISYS CORP	48	24	36.88	0.9	2.4
A	WANG LABS INC	19	10	14.88	0.8	5.3

Software & DP Services

Q	ADVANCED COMP TECH	6	1	2.13	0.5	30.8
N	AGS COMPUTERS INC	30	11	17.25	2.0	13.1
Q	AMERICAN MGMT SYS INC	20	9	16.88	-1.1	-6.3
Q	AMERICAN SOFTWARE INC	22	6	12.00	0.4	3.2
N	ANACOMP INC	11	4	7.75	-0.1	-1.6
Q	ANALYSTS INTL CORP	10	4	7.25	0.3	3.6
Q	ASHTON TATE	33	13	28.50	1.1	4.1
Q	ASK COMPUTER SYS INC	17	6	12.25	0.1	1.0
Q	AUTODESK INC	34	12	23.00	0.8	3.4
N	AUTO DATA PROCESSING	55	16	46.00	3.0	7.0
Q	BOOLE & BABBAGE INC	12	5	8.25	0.5	6.5
N	COMPUTER ASSOC INTL INC	37	15	29.13	0.5	1.7
Q	COMPUTER HORIZONS CORP	15	7	9.50	-0.1	-1.3
N	COMPUTER SCIENCES CORP	73	42	51.13	-0.9	-1.7
N	COMPUTER TASK GROUP INC	17	9	10.00	0.1	1.3
N	COMSHARE INC	28	12	14.50	0.8	5.5
Q	CULLINET SOFTWARE INC	14	4	6.00	-0.4	-5.9
Q	CYCARE SYS INC	10	6	7.88	0.0	0.0
Q	OUQUESNE SYS INC	33	10	19.75	-0.8	-3.7
A	DATA ARCHITECTS INC	17	7	13.63	0.1	0.9
Q	GENERAL MTRS (CLS E)	51	30	41.75	2.0	5.0
Q	HOGAN SYS INC	17	5	5.00	-0.1	-2.4
Q	INFORMIX CORP	31	12	20.00	-3.5	-14.9
Q	INTELLICORP INC	11	2	2.88	-0.1	-4.2
Q	KEANE INC	10	6	7.50	0.5	7.1
Q	LOTUS DEV CORP	40	19	30.50	0.3	0.8
Q	MANAGEMENT SCI AMER	20	6	7.50	1.1	17.6
Q	MICRO PRO INTL CORP	8	3	3.75	0.3	7.1
Q	MICROSOFT CORP	79	37	59.50	-0.4	-0.6
Q	MORINO ASSOCIATES INC	24	7	16	-1.0	-6.1
Q	NATIONAL DATA CORP	34	19	26.50	0.0	0.0
Q	ON LINE SOFTWARE INTL INC	22	9	11.25	-0.1	-1.1
Q	ORACLE SYS CORP	19	8	15.00	-0.5	-3.2
N	PANSOPHIC SYS INC	28	11	15.75	0.1	0.8
Q	POLICY MGMT SYS CORP	30	15	23.50	1.3	5.6
Q	PROGRAMMING & SYS INC	14	7	12.75	1.3	10.9
Q	REYNOLDS & REYNOLDS CO	39	14	21.25	0.8	3.7
Q	SEI CORP	18	10	16.50	1.5	10.0
Q	SHAREO MEO SYS CORP	38	19	25.63	-1.0	-3.8
Q	SOFTWARE AG SYSTEMS INC	17	7	12.75	1.3	10.9
Q	SOFTWARE PUBG CORP	17	5	13.50	1.0	8.0
A	STERLING SOFTWARE INC	14	6	8.38	0.0	0.0
Q	SUNGARO DATA SYS INC	21	10	17.00	0.8	4.6
Q	SYSTEMATICS INC	30	19	27.50	-0.5	-1.8
N	SYS. SOFT INC.	24	7	16	-0.5	-3.1
Q	VM SOFTWARE INC	45	7	12.00	-0.3	-2.0

Semiconductors

N	ADV MICRO DEVICES INC	25	8	12.38	0.1	1.0
N	ANALOG DEVICES INC	24	8	13.38	0.3	1.9
Q	ANALOGIC CORP	13	5	7.00	0.1	1.8
Q	INTEL CORP	42	18	29.00	0.5	1.8
Q	LSI LOGIC CORP	17	7	9.75	0.5	5.4
N	MOTOROLA INC	74	35	48.50	1.4	2.9
N	NATL SEMICONDUCTOR	22	10	12.13	0.8	6.6
N	TEXAS INSTRS INC	80	36	54.13	2.9	5.6
A	WESTERN DIGITAL CORP	33	11	14.88	0.0	0.0

Peripherals

Q	ALLOY COMP.	13	3	3.63	0.3	7.4
N	AM INTL INC	9	3	4.13	0.1	3.1
Q	AST RESH INC	23	6	9.75	0.6	6.8
Q	AUTO TROL TECH CORP	9	3	5.25	1.3	33.3
Q	BANCTEC INC	16	5	7.88	1.1	16.7
Q	CIPHER DATA PRODS INC	16	4	8.25	1.0	13.8
A	COGNITRONICS CORP	5	2	2.88	-0.1	-4.2
N	COMPUGRAPHIC CORP	28	19	22.25	-0.1	-0.6
N	COMPUTERVISION CORP	22	7	7.00	0.0	0.0
A	OATAPRODUCTS CORP	24	7	8.88	0.5	6.0
A	OATARAM CORP	9	5	6.25	0.3	4.2
N	DECISION INOS CORP	13	4	10.63	0.0	0.0
N	EASTMAN KODAK CO	71	40	44.00	2.6	6.3
Q	E M C CORP MASS	29	10	14.75	-0.3	-1.7
Q	EMULEX CORP	9	4	7.75	0.1	1.6
Q	EVANS & SUTHERLAND	40	18	20.00	-0.3	-1.2
Q	ICOT CORP	13	3	5.00	0.3	5.3
Q	INTERLEAF INC	24	9	17.63	-1.0	-5.4
Q	IONEGA CORP	6	1	2.94	-0.1	-2.1
Q	LEE DATA CORP	9	3	3.88	0.1	3.3
Q	MASSTOR SYS CORP	6	1	2.06	0.2	10.0
Q	MAXTOR CORP	33	6	13.38	0.4	2.9
Q	MICROPOLIS CORP	44	13	27.75	3.8	15.6
Q	MINISCRIBE CORP	18	5	10.00	1.0	11.1
N	MINNESOTA MNG & MFG CO	84	45	59.25	0.3	0.4
A	MSI DATA CORP	27	12	24.75	0.4	1.5
Q	PRIAM CORP	6	1	2.31	0.2	8.8
Q	PRINTRONIX INC	13	7	8.75	0.1	1.4
N	QMS INC	27	8	9.38	-0.1	-1.3
Q	QUANTUM CORP	35	8	11.00	0.3	2.3
Q	RAMTEC CORP	6	2	4.13	0.3	6.5
N	RECOGNITION EQUIP INC	24	7	9.50	0.4	4.1
Q	REXON INC	14	5	7.00	0.0	0.0
Q	SCAN TRON CORP	14	7	10.25	0.0	0.0
Q	SEAGATE TECHNOLOGY	46	10	19.63	0.6	3.3
N	STORAGE TECH CORP	5	1	1.75	-0.3	-12.5
Q	TANOON CORP	7	1	1.56	-0.2	-10.7
A	TEC INC	7	3	4.63	-0.2	-3.9
N	TEKTRONIX INC	41	21	25.50	0.3	1.0
Q	TELEVIDEO SYS INC	3	1	1.31	0.0	0.0
N	TELEX CORP	99	30	51.00	1.0	2.0
Q	WYSE TECH	40	11	20.50	0.1	0.6
N	XEROX CORP	85	50	61.75	5.1	9.1
Q	XIOEX CORP	16	6	6.88	0.1	1.9

Postal Service ousts mainframe application for CD-ROM scheme

BY JAMES A. MARTIN
CW STAFF

WASHINGTON, D.C. — In what is said to be the largest nationwide installation of compact disk/read-only memory technology in a production environment, the U.S. Postal Service has unhooked its mainframe-based ZIP code retrieval system and replaced it with more than 400 CD-ROM drives. Officials said the project is saving as much as 50% in on-line transaction costs.

In December 1987, the Postal Service initiated its CD-ROM program, deploying a total of 438 systems to postal facilities across the nation for use by mail forwarding sites and ZIP code information clerks handling telephone inquiries. The CD-ROM project was designed, in part, to wean the Postal Service away from the monthly costs of contracting its mainframe data base processing and on-line terminals from a service company.

"I expect we will see a 50% reduction in cost per ZIP code retrieval, based on the same volume year to year between on-line and CD-ROM access," said Michael Selnick, program manager for the ZIP code retrieval system at the Postal Service's headquarters here.

Struggling for acceptance

The Postal Service's use of CD-ROM comes at a time when the acceptance level of the technology by users is embryonic at best. Despite backing from such players as Microsoft Corp., whose annual CD-ROM conference unfolded in Seattle last week, analysts predicted that by the early 1990s, only 5% to 8% of the world's PC users will access a CD-ROM system.

"Although there are specific applications for CD-ROM today — with attorneys, hospitals, pharmaceutical companies and the like — no one I know has



The Postal Service's
Michael Selnick

been able to imagine an application that will stimulate PC users to go out en masse and buy expensive CD-ROM hardware and software," said Jim Porter, president of Disk/Trend, Inc.

As a result, the Postal Service is to be commended for taking the bold step toward embracing the fledgling optical-disk technology, said Linda W. Helgerson, editor and publisher of the "CD Data Report."

The Postal Service CD-ROM program was developed to more economically and reliably automate its ZIP+4 system, in which customers are assigned a nine-digit ZIP code in exchange for a discount on bulk mailing charges.

The CD-ROM systems installed at Postal Service locations consist of Hitachi Ltd. 1503S drives attached to Telex 1280s, which are IBM Personal Computer AT compatibles made by Telex Computer Products, Inc. Each of the 438 Telex PCs has a dedicated CD-ROM player that replaces the on-line ITT Corp. 110382 IBM 3270-type terminals in accessing current ZIP+4 address data.

Those terminals were linked via leased lines to the IBM 3090 Models 200 and 300E housed at the First Data Resource, Inc. data center in Omaha. First Data is a government service contractor that has maintained the Na-

tional Directory File data base for more than four years and has provided the Postal Service with its CD-ROM system through a competitively bid contract.

The ZIP+4 retrieval system started out as 44,000 pages of printed data in the form of a 47-volume directory, two copies of which were distributed to each of the 39,400 postal units nationwide and updated annually, Selnick said. Although the directory is still published, the Postal Service signed a contract with First Data four years ago to maintain the National Directory File and provide access via on-line terminals. The national address data base is a 3.2G-byte file that First Data compresses onto a single 660M-byte CD-ROM disk. Each month, 438 copies are distributed to postal facilities with CD-ROM systems. First Data updates its data base from magnetic tapes of data downloaded from the Postal Service's ZIP+4 on-line data base.

Speed trade-offs

Despite the savings in transaction costs, Selnick admitted there is some trade-off for CD-ROM in terms of access speeds. Initially, accessing information in the National Directory File on First Data's 3090 took seven to eight seconds, Selnick estimated.

"Over time, that was improved to about two seconds. Right now, with the CD-ROM system, we're experiencing a response time of about three seconds, but we expect that will be brought down as technology improves."

In addition, the CD-ROM disks must be updated monthly, which means the information retrieved from an optical disk might not be as current as that found in an on-line mainframe data base. As more postal sites go on-line with CD-ROM, the costs of monthly updates will decrease, Selnick added.

CD-ROM moves past 'gee whiz'

BY JAMES A. MARTIN
CW STAFF

SEATTLE — Although no one expects 1988 to be the year compact disk/read-only memory takes off, the fledgling technology took a few significant steps toward maturation at the third annual Microsoft Corp.-sponsored CD-ROM conference here last week.

With the long-awaited market entry announcement of Apple Computer, Inc. and new local-area networking features and technology improvements from other vendors — as well as growing interest from MIS — CD-ROM appears finally to be becoming a viable, though limited, technology.

"Last year, the show was focused mostly on ideas about the 'gee-whiz' potential of CD-ROM," said Pamela B. Roberts, a storage analyst with market research firm Infocorp. "This year, what impresses me is that there are now commercial services and products available that are pragmatic."

Apple steals the show

Apple dominated the conference with a glitzy introduction of its \$1,199 CD-ROM drive. The firm claimed CD SC will work with a version of its Hypercard, enabling users to interface with the large files contained on CD-ROM platters.

Apple said its CD-ROM will plug directly into the Macintosh Plus, Mac SE and Mac II small computer systems interface ports. CD SC will reportedly be supported on the Appleshare network and by the new Appleshare Version 2.0 file server operating system, which was announced separately last week.

To date, CD-ROM has been widely criticized as being too limited for serious MIS application. Spectrum Interactive, a Bed-

ford, Mass.-based training and systems contractor, also announced last week it has a tentative agreement with American Airlines to develop a nationwide CD-ROM project for the airline's Sabre reservation system.

In living color

In what is said will be one of the first large-scale CD-ROM applications in the private sector, the system will consist of a Sony Corp. CDU-100 drive attached to an IBM Personal System/2 Model 30 running on an IBM Token-Ring network. Spectrum's digital audio/video encoding reportedly enables travel agents using the Sabre system with CD-ROM to show customers high-resolution color images of vacation spots and hotel rooms.

"The ability to merge pictures with the huge data base of information in Sabre offers American a strong competitive advantage," said Max Hopper, executive vice-president of the airline, in a prepared statement. The Sabre travel information network is used in some 14,000 locations on about 60,000 terminals. The project is scheduled to go on-line late this year.

Other announcements at the show included the following:

- Microsoft announced Version 2.0 of its MS-DOS CD-ROM Extension, which reportedly includes the ability to read disks in both the "High Sierra" file format and the slightly different ISO 9660 version of that format, according to Tom Lopez, vice-president of Microsoft's CD-ROM division.

- Hitachi Corp. said it has developed a portable CD-ROM drive for the Compaq Computer Corp. Portable III. Hitachi said it will be available in limited quantities in June and cost \$1,500.

- Meridian Data, Inc. in Capitola, Calif., unveiled what it called the "first network CD-ROM drives," which reportedly enable multiple CD-ROM drives and data bases to be integrated into an IBM Token-Ring, Ethernet or Arcnet LAN.

CD Net is set to be available in April for \$2,995.

Meridian's CD Server is slated to be available in April for \$5,995.

NCR minis

FROM PAGE 1

A low-end 32M-byte model, with support for 20 terminals, will be used at remote locations. Two mid-range models will support about 200 or 750 terminals, respectively, while a 128M-byte high-end dyadic processor will support 1,000 terminals.

The high-end model will reportedly include an icon-based software-generator that will allow nonprogrammers to write applications, user sources said. NCR will also package the high-

end model with Oracle Corp.'s relational data base and a new release of ITX called Release 6.0, users said.

The move is the first major hardware announcement for ITX users since the NCR 9500 debuted in early 1986.

The system architecture will allow users to address the full limit of 999 attached terminals that can theoretically be supported under ITX. By contrast, many NCR 9300 and 9400 users claim their current practical limitation is fewer than 50 terminals.

Very large-scale integration

chips and surface-mount technology enabled NCR to develop compact units with low power consumption.

'All the advantages'

"This new machine will be smaller than the original NCR 9800 box," said Mark Steidinger, data processing director of First Bank and Trust Co. in Menomonie, Wis. "But it has all the advantages of ITX software."

ITX is optimized for on-line transaction processing, which allows banks, retail businesses and manufacturing firms to add terminals without disrupting opera-

tions. Older ITX applications are expected to run on the new systems.

Code-named Top Gun, the architecture has the potential to replace the NCR 9300, 9400 and 9500 with an expandable system that offers greater speed and capacity. But NCR users and analysts said NCR would not immediately withdraw the older systems. "Users of older ITX systems will probably be able to chain these systems together in the same network," said one Midwestern user who asked not to be named.

NCR appears to have a corpo-

rate plan for updating each of its primary hardware platforms, said Mike Geran, vice-president of research at The Nikko Securities Company International, Inc. in New York. The ITX introduction echoes that of the NCR 9800 debut, in which a modified version of the mainframe VRX system was adapted for use on another building-block architecture, Geran noted.

The 9800 family was announced as a successor to the NCR 8000 series and was designed to support incremental growth with the addition of multiple processors.

Skills crunch

FROM PAGE 1

- Managers are having trouble finding qualified data base administrators and data base analysts.
- Finding communications managers and communications specialists is a difficult chore.
- Qualified systems programmers are in short supply.

And the difficulties are expected to continue. Increased specialization and the proliferation of technology will combine with what some experts call "the baby bust" — a sharp decrease in the number of people entering

paying 10% to 15% more for experienced DB2 professionals than for pros equivalently skilled in nonrelational DBMSs.

- Application development tools, such as code generators and computer-aided software engineering systems. Because no standards are in place, there is no one set of tools familiar to most professionals, and many programmers have had no exposure to the products.

- Networking, particularly workstation-level connections and software. Companies are re-deploying many data center professionals to network management functions because of internal demand.

Skills at a premium

Shortages of experts in certain technologies that have been around for some time are aggravated by increased interest in the technologies from MIS organizations and vendors. These areas include the following:

- Standard IBM large-scale operating system internals. A historic drought of internals programmers is worsening as software companies hire experts to build systems that work with IBM's VM and MVS.
- Unix and Ada internals. As Unix and Ada become more popular in military and multivendor applications, the relatively small supply of programmers in these areas is quickly being depleted.
- Artificial intelligence applications. There is no shortage of computer scientists interested in AI, but professionals who are experienced in the practical implementation of AI in expert systems to serve business applications are rare.

"In the last five years, there has been an explosion in skill requirements," says Richard Harrison, director of the Federal Software Management Support Division of the General Services Administration.

In the past, programmers could qualify for positions with general knowledge, Harrison adds. Now, a programmer working with an IBM 3090, for instance, is required to know all the utilities and support features of the software on the mainframe before he even gets to the applications. Harrison says that

Causes of MIS employee shortages

100 MIS managers list leading factors causing shortages

	Percent of respondents
Changes in technology	35%
Lack of education and training	23%
Lack of senior professionals	14%
Unique application or equipment	11%
Location outside of a major metropolitan area	8%
Other	9%

INFORMATION PROVIDED BY A 1988 COMPUTERWORLD SURVEY
CW CHART

"85% of the machine is eaten up by its own facilities."

The results of shortages in technical areas, while not disastrous, are often costly to MIS organizations. "We run at risk" from developing projects using inexperienced staff members, says a data administrator for a large insurance company.

When the professionals simply cannot be found, managers must place less experienced employees in charge of important projects. Rather than do that, many companies step up their recruitment efforts, looking to other companies to find the people they need.

For example, as a result of the shortage of relational data base

don't know where to get the candidates. Every company is into telecommunications these days, and there is no source of talent."

Some companies are staffing up too quickly to meet their needs by hiring trainees. The Hamilton Standard Electric Division of United Technologies Corp. in Windsor Locks, Conn., is able to fill only about 50% of its vacancies each month, says data manager Raymond Levesque. "We're having a tough time getting people across the board."

In addition to skill shortages, the company cannot compete with the high salaries and more varied opportunities offered by neighboring insurance companies in the Hartford, Conn., area. The firm's location in the Northeast, where unemployment is low and the cost of living high, also does not help matters.

One result of these problems is that the company is promoting its experienced staff, in some cases, moving managers to a higher level of responsibility than they may be ready to attain, Levesque says.

Going national

Other companies, such as Inland Container Corp. in Indianapolis, are changing their practice of regional recruiting in favor of national advertising. "We're looking at people from other markets on the West Coast and in the South and Midwest," says Ken Thomas, Inland's MIS manager.

It took Thomas more than six months to fill three operating systems programmer positions. The sticking point was that candidates had to be knowledgeable in EDL, the operating system for IBM Series/1 computers. "We were doing without the staff we needed," Thomas says. "Our projects were not completed on time." Inland also found it hard to recruit programmers familiar with Natural, Software AG of North America, Inc.'s fourth-generation language, and DOS/VSE systems programmers for a new IBM 9370.

"We hired services from IBM's Professional Services Group to keep the project going," Thomas says. "When something is a requirement, you do whatever you have to do to get the job done." IBM charged Inland more than \$10,000 to have a professional install VSE on the 9370 and accomplish

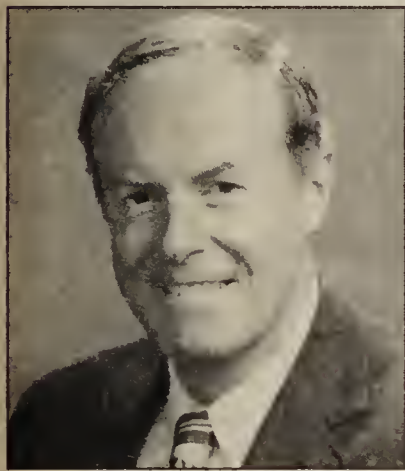
some preliminary software work, Thomas says.

Many companies are also finding it hard to locate MIS professionals with specialization in specific industries.

"Companies are becoming more specific about the business experience they want," says Richard W. Bell, staffing manager for Arthur Young in Dallas. "They are pigeonholing positions based on industry backgrounds in manufacturing or retail or health care."

Bell chairs the Southwest High Technology Cooperative in Dallas, a consortium of companies that holds its own annual computer career fair. Thirty-eight firms are expected to participate in the fair this year, the largest number in the event's five-year history.

The shortage of specific industry knowledge and business skills is also being felt at the ex-



Rockwell's Sutter

the work force during the next 10 years.

Fifty-five percent of the managers interviewed in the *Computerworld* survey say they foresee shortages of MIS employees for the next five years. To maintain staff and find the experts their companies need, managers say they are developing new hiring strategies and finding ways to do without certain personnel.

The shallow end

Emerging technologies for which no pool of talent has yet developed are focal points for many of the shortages. But certain mature technologies that are less popular with the current crop of computer professionals are also showing signs of a shrinking supply of workers.

Among the emerging technologies currently experiencing shortages are these:

- Relational data base management systems, particularly IBM's DB2. Some firms report



The GSA's Harrison

experts, Conoco, Inc., a Ponca City, Okla., oil company, has had to step up its college recruitment program to replace DB2-trained employees who have been recruited away, says John Happ, employee relations manager.

"A number of our people have left for what they saw as better opportunities," Happ says.

Happ says he is also concerned about a lack of available telecommunications talent. "I



COMPANIES are becoming more specific about the business experience they want."

RICHARD W. BELL
ARTHUR YOUNG

ecutive levels of many companies. Seventy-seven percent of the MIS managers interviewed reported difficulty in finding qualified MIS professionals for management positions.

The new requirements of companies seeking MIS executives may be the source of the difficulty. Most of these companies are requiring their top MIS executives to possess a strong combination of industry and business knowledge as well as technical expertise.

Shortages of such professionals are pushing compensation packages into the \$250,000 range. In rare cases, firms are offering more than \$500,000 annually to capture a top executive.

"There is tremendous pressure for increased compensation," says James Sutter, Rockwell International, Inc.'s vice-president of information systems. "We don't go off the deep end like some of the financial services firms, but it's an expensive proposition."

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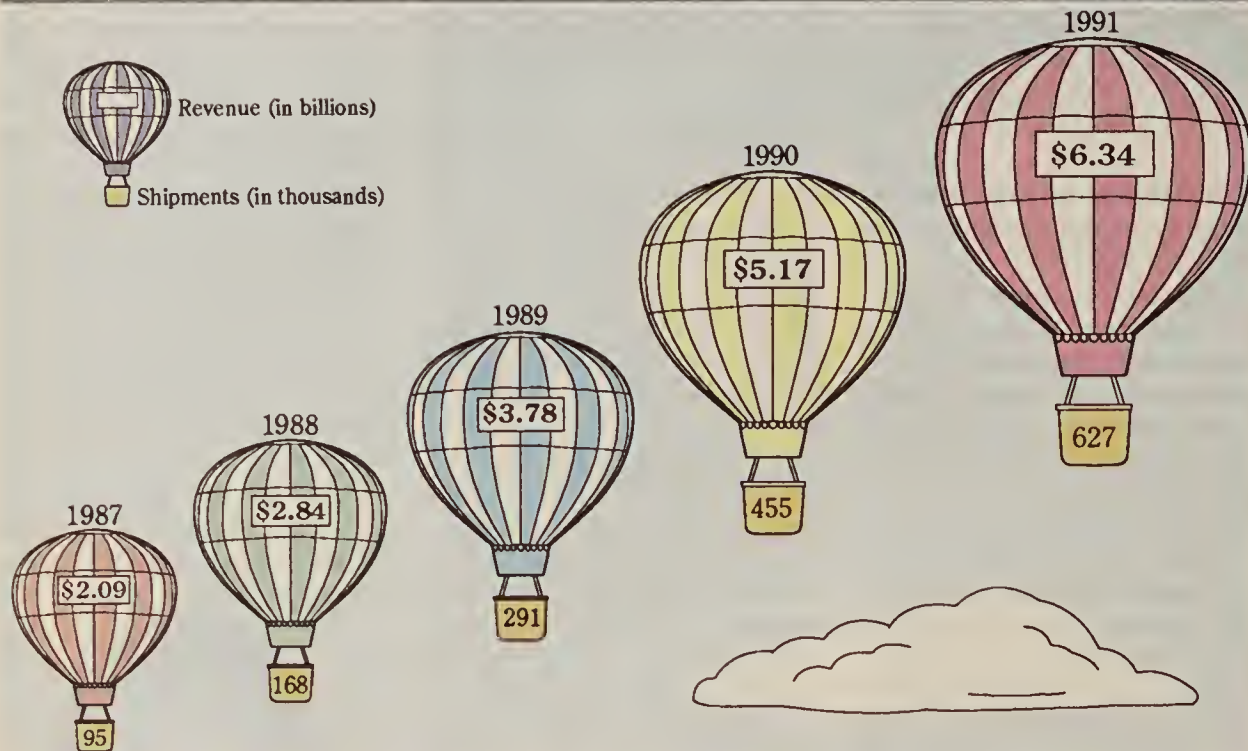
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TRENDS

Graphics workstations

Shipments expand, sending revenue up, up and away



A hot commodity since their debut in 1980, technical workstations will be a \$6 billion market by 1991, according to Dataquest, Inc. in San Jose, Calif.

Graphics and networking capabilities account for the rapid market growth, Dataquest says. "Networking on a workstation is easier than networking on a PC, since workstations do not get into the network code," said Brad Smith, Dataquest's director of research. "This combination is ideal for projects involving more than one engineer."

Declining average selling prices correspond to lower prices of component parts, coupled with companies manufacturing in higher volumes. This should not present a problem for technical workstation vendors. "Typically, you get three times the volume when you cut the price in half," Smith said.

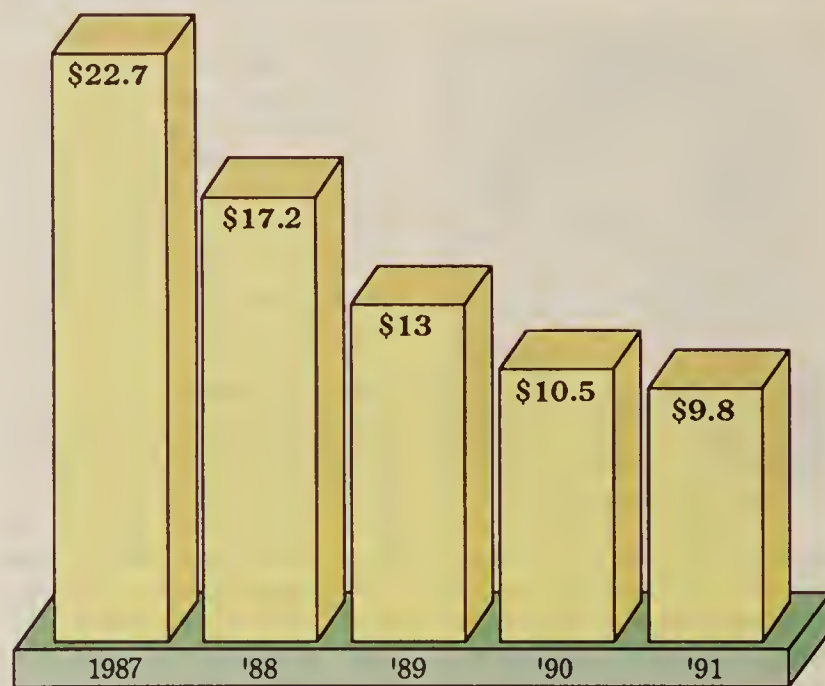
While both Sun Microsystems, Inc. and Apollo Computer, Inc. have strong market shares, Smith predicted Sun will hold the lead. "They're aggressive players and quick to lower their prices. Sun is also playing the Unix trend," he added. Digital Equipment Corp. holds the No. 3 spot. "DEC owns much of the software for engineering's superminis. They network everything from the workstations to the two million systems," Smith said.

Currently, more than 200,000 technical workstations are installed. There are 8½ million engineers, scientists and technicians worldwide.

SALLY CUSACK

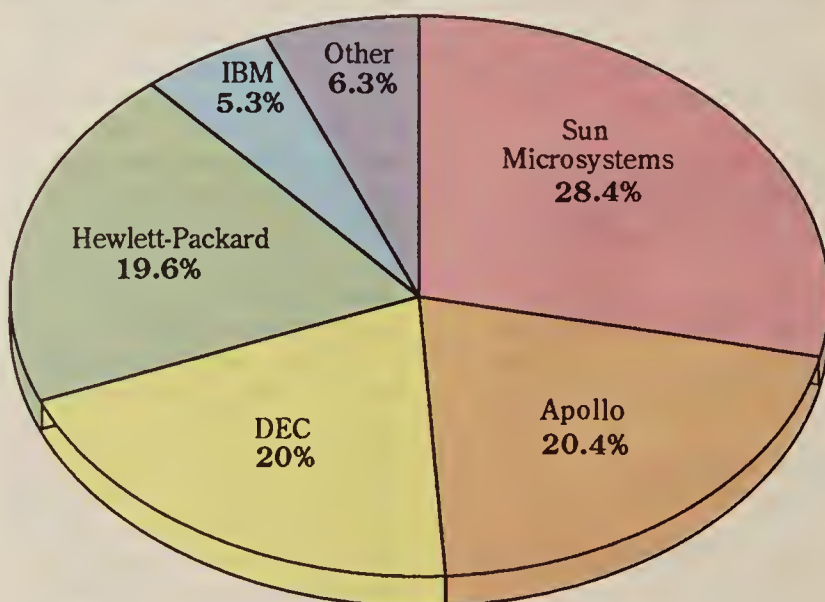
Average workstation price will tumble

AVERAGE PRICE (IN THOUSANDS)



Sun steals the lead

MARKET SHARE (BASED ON UNIT SHIPMENT)



INFORMATION PROVIDED BY DATAQUEST, INC.
CW CHARTS: FRANK C. O'CONNELL

INSIDE LINES

TAC one on. Late this month, Lotus will announce a new version of The Application Connection (TAC), Version 5.0, and a common way for Lotus applications to share data. TAC, which shifts data between micros and IBM hosts, will embrace hosts other than IBM 370s and is expected to work with Lotus's mainframe 1-2-3/M. Lotus will also describe a new interface for 1-2-3 that facilitates data transfer without file conversion.

Toeing the line. Tandy has put together the board layouts for an IBM Micro Channel-compatible system and is only waiting for delivery of Chips and Technologies' chip set and Phoenix Technologies' ROM BIOS, both of which it should have in the next week or so, according to sources. Tandy reportedly will ship 100 systems to selected dealers for demo purposes around the middle of April. This is Tandy's way of gathering customer reaction and testing the legal waters without making an official announcement. The system encompasses a 20-MHz Intel 80386, 2M bytes of RAM, caching chips from Intel, a 16-bit Video Graphics Array on the motherboard and an IBM Personal System/2-compatible mouse port, according to sources. No word yet on what its price will be.

Slimming down. Computer Corporation of America, which was put up for sale last year by parent company Crowntek, quietly trimmed 40 people from its field sales force last month. A spokeswoman said the layoffs are not related to the current search for a buyer but are rather a strategic move to refocus the firm's resources. Computer Corporation is exploring the possibility of a leveraged buy-out by management and is also seeking outside buyers. The Cambridge, Mass., developer of mainframe data base management systems employs about 400 people worldwide.

You've got to serve somebody. Rumblings have it that Microrim is seriously contemplating offering its R:Base DBMS as a front end to the Ashton-Tate/Microsoft/Sybase SQL Server. The only difficulty lies in getting R:Base's subset of SQL to talk effectively to SQL Server, a source said.

They threw money at him like there was no tomorrow, but even a package of \$50 million in tax incentives couldn't sway Steve Chen to move his Supercomputer Systems, Inc. start-up from Wisconsin to Illinois. For several weeks, Illinois officials hoped that Chen's personal ties to the University of Illinois at Urbana, where he earned his Ph.D. in 1975, would bring his company across the border — along with 2,000 potential jobs. But Chen turned Illinois down, saying that a move would disrupt the initial planning work being conducted by 40 staff scientists.

Send the letters to Washington. The IRS has its eye on companies that improperly classify their employees — such as data entry clerks or programmers — as "independent contractors" in order to evade employment taxes [CW, Aug. 25, 1986]. A major IRS crackdown using 400 revenue agents has netted 9,000 culprits so far. Tax assessments have been issued to 92% of those employers selected for audits. More information on the employee classification rules can be found in the IRS's Publication 539, "Employment Taxes."

The ax comes down. Less than two months after installing a new top management team, Tektronix announced it will lay off 1,000 employees by the end of May. The first cuts will affect 300 workers in the Beaverton, Ore.-based firm's information display group. Those employees were notified last Friday. Most layoffs will occur in the Portland, Ore., metropolitan area, where 11,000 of Tektronix's 16,900 employees work, and will affect mainly managerial and professional positions. New Tektronix CEO David Friedley said the firm has been "operating at less than maximum efficiency."

"More tips!" the news editor demands. So I says, "You want more people calling in? Fine, I'll give them your name!" So call the Computerworld hot line at 1-800-343-6474 and ask — no, demand — to speak with Pete Bartolik. Let's see how long he can hold up.

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McDermott International, Inc., makes the world's largest offshore oil-producing platforms. It also makes jobs for thousands of people all over the world, which makes for a fairly complex and dynamic payroll. A payroll that had become even more complex because of the acquisition of the Babcock & Wilcox Company. That's why McDermott went to Management Science America, Inc., where they found some excellent payroll solutions with the MSA Human Resource System.

Babcock & Wilcox had a payroll system that was incompatible with McDermott's. So McDermott's first step was to draft a list of their new software needs. "We had a 50-item, 10-page document that listed the specifications we needed for our software," notes Jim Maumus, Payroll Specialist at McDermott. "We listed some pretty stringent requirements, but MSA had a system that was what we needed for payroll purposes. Now our payroll department responds more accurately and rapidly to corporate needs. We're saving time with our new Human Resources System, which means we're saving money."

Maumus is a good authority on the subject of payroll administration—in 1986, the American Payroll Association honored him with the national Payroll Man of the Year award. His summation assessment of MSA?

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